

2014-1677

**United States Court of Appeals
for the Federal Circuit**

BELDEN INC.,

Appellant,

v.

BERK-TEK LLC,

Appellee.

*Appeal from the United States Patent and Trademark Office
Patent Trial and Appeal Board in No. IPR2013-00069*

BRIEF OF APPELLANT BELDEN INC.

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October 3, 2014

CERTIFICATE OF INTEREST

Counsel for Appellant Belden Inc. certifies the following:

1. The full name of every party or amicus represented by me is Belden Inc.
2. The name of the real party in interest is Belden Inc.
3. No parent corporation or any publicly held company owns 10 percent of more of the stock of Belden Inc.
4. The names of all law firms and the partners and associates that have appeared for Belden Inc. before the United States Patent and Trademark Office or are expected appear in this Court are: Foley & Lardner LLP attorneys Matthew B. Lowrie, Aaron W. Moore, and Matthew A. Ambros.

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I. STATEMENT OF RELATED CASES

Pursuant to Fed. Cir. R. 47.5(a), Appellant Belden Inc. (“Belden”) certifies that there is no other appeal in this proceeding from the United States Patent and Trademark Office that was previously before this Court or any other appellate court.

On September 2, 2014, this Court ordered that the present appeal be considered a companion case with Appeal No. 14-1676 and assigned to the same merits panel for oral argument. (Doc. 17.)

Belden and Appellee Berk-Tek LLC (“Berk-Tek”) are presently engaged in cross-appeals concerning a separate patent (Appeal Nos. 14-1575 and 14-1576) that are presently before this Court.

Pursuant to Fed. Cir. R. 47.5(b), the Court’s decision in this appeal may affect *Nexans Inc. v. Belden Inc., et al.*, No. 12-cv-1491 (D. Del.), a district court action in which the involved U.S. Patent No. 7,663,061 is asserted. The district court action has been stayed pending the outcome of the present appeal. (*See* Jun. 19, 2014 Order Re. D.I. 85.)

II. STATEMENT OF JURISDICTION

The United States Patent and Trademark Office (“PTO”) Patent Trial and Appeal Board (the “Board”) had jurisdiction over Berk-Tek’s *inter partes* review Petition pursuant to 35 U.S.C. § 6.

On April 28, 2014, the Board issued its Final Written Decision in the *inter partes* review. (A42; A1-A26.) On June 27, 2014, in compliance with 37 C.F. R. § 90.3(a)(1), Belden timely filed its Notice of Appeal. (Doc. 1.)

On September 2, 2014, this Court ordered that the present appeal be considered the companion to Appeal No. 14-1676. (Doc. 17.)

This Court has jurisdiction pursuant to 28 U.S.C. § 1295(a)(4)(A) and 35 U.S.C. § 329.

III. STATEMENT OF THE ISSUES

1. Whether the Board erred in finding that claims 1-5 and 7-20 of U.S. Patent No. 7,663,061 (the “’061 Patent”) are unpatentable under 35 U.S.C. § 102 as anticipated by Canadian Application No. 2,058,046 to Tessier (“Tessier ’046”), where the reference does not contain the claimed “channels” and does not teach a cable in which the core and the conductors are “twisted together,” as required by the claims, and where the Board completely disregarded unrebutted evidence of the meaning of the claims and the teachings of the reference from a person of ordinary skill in the art;
2. Whether the Board erred in finding that claim 6 of the ’061 Patent is unpatentable under 35 U.S.C. § 103 as obvious over Tessier ’046 and Canadian Application No. 7,071,417 to Meer (“Meer ’417”);
3. Whether the Board erred in finding that claim 21 of the ’061 Patent is unpatentable under 35 U.S.C. § 103 as obvious over Tessier ’046 and Japanese Patent Sho56 (1981)-7307 to Fuchigami (“JP ’307”); and
4. Whether the Board’s Final Decision is supported by substantial evidence, even though, *inter alia*, Berk-Tek did not cross-examine Belden’s expert witness or submit any alternative testimony of a person of ordinary skill in the art.

IV. STATEMENT OF THE CASE

This appeal arises from an *inter partes* review (“IPR”) instituted by the Board under the Leahy-Smith America Invents Act (“AIA”). Belden, the petitioner in this appeal, is the owner of the ’061 Patent, for which the Board instituted IPR.

As shown herein, the Board made errors in its legal conclusions and performed fact finding that lacks the support of substantial evidence. In particular, the Board’s Final Decision of unpatentability is premised entirely on unsupported attorney argument that is demonstrably incorrect, and the Board improperly ignored an unrebutted declaration from a person of skill in the art explaining the meaning of the language used in the ’575 Patent’s claims and the teachings of the prior art.

V. STATEMENT OF FACTS

A. PROCEDURAL HISTORY

On December 3, 2012, Berk-Tek filed its Petition for IPR of Belden’s ’061 Patent. (A42.)¹ On December 11, 2012, Berk-Tek filed revised petition exhibits with corrected numbering. (A42; A106.)

¹ Prior to the filing of Berk-Tek’s declaratory judgment complaint and Berk-Tek’s IPR Petition, the ’061 Patent was asserted in litigation that was terminated by consent judgment prior to the commencement of discovery. *See Belden Inc. v. Superior Essex Inc. et al.*, No. 11-cv-678 (D. Del.) (D.I. 19).

On May 23, 2013, the Board issued its Decision instituting IPR on three Grounds: (1) anticipation of claims 1-5 and 7-20 by Tessier '046; (2) obviousness of claim 6 in view of Tessier '046 and Meer '417; and (3) obviousness of claim 21 in view of Tessier '046 and JP '307. (A42; A432-A433.)

On August 1, 2013, Belden filed its Response, identifying the deficiencies in the Grounds on which the Board instituted IPR, with the support of an expert declaration from the '061 Patent's inventor, Galen Gareis. (A42; A463-A485.) Berk-Tek filed its Reply on October 10, 2013. (A42.)

The Board heard oral argument on January 8, 2014 (A42) and issued its Final Written Decision on April 28, 2013, finding the claims of the '061 Patent unpatentable for the Grounds contained in its Order Instituting IPR. (A42; A1-A26 at A25.)

On June 27, 2014, Belden timely filed its Notice of Appeal, seeking review of the Board's invalidity rulings. (Doc. 1.)

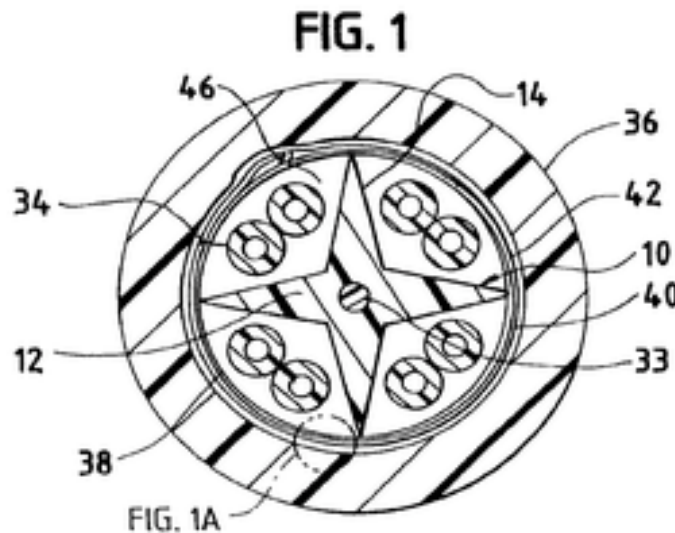
The '061 Patent was also the subject of an *inter partes* reexamination. (*In re Gareis et al.*, Control No. 95/001,673). That reexamination was terminated when co-pending District Court proceedings were settled. (*See, e.g., In re Gareis et al.*, Control No. 95/001,751 (February 24, 2012 Decision Granting Petition to Terminate)). At the time of the termination, in a ***non-final*** action, the Examiner had found a substantial new question of patentability affecting claims 1-21 of the '061 Patent.

B. THE CLAIMED INVENTION

The '061 Patent is directed towards a high-speed telecommunications cable that has an interior support or “star separator.” (A31-A40, '061 Patent, at 1:12-27; A463-A485 at A469-A470; *see also* A1-A26 at A3-A4.)

1. “Channels”

In the '061 Patent's cable, a separator extends along the length of the cable, and has a central region and a plurality of prongs or splines that extend outward from the central region. When an overall jacket is applied to the cable, the separator's prongs or splines, along with the cable jacket, define “channels” through which twisted cable pairs run. (A463-A485 at A473-A475; A494-A510, ¶¶ 15-21.) An embodiment is illustrated in Figure 1 of the '061 Patent:



(A31-A40, '061 Patent, at A34)

As shown by the language highlighted below, claim 1 requires that the separator, in cooperation with the cable's outer jacket, creates "channels" into which twisted pair conductors are located.

1. A communications cable comprising:

a plurality of twisted pairs that carry communications signals;

a pair separator disposed among the plurality of twisted pairs, the pair separator comprising a central body portion and a plurality of arms radially extending from the central body portion, each pair of adjacent arms defining a *channel*; and

a cable covering surrounding the plurality of twisted pairs and the pair separator along the length of the cable;

wherein at least one twisted pair of the plurality of twisted pairs is respectively located in the *channel* defined by each pair of adjacent arms;

wherein the plurality of twisted pairs and the pair separator are helically twisted together along the length of the cable; and

wherein the cable covering does not include an electrically conductive shield.

(A31-A40, '061 Patent, at 6:42-59) (emphasis added).

Similar to claim 1, independent claims 7 and 12 also require the arms of the separator to define "channels." (A31-A40, '061 Patent, at 7:6-24, 7:35-8:3; A463-A485 at A473-A475.) Claim 7 recites "a pair separator disposed among the plurality of twisted pairs, the pair separator comprising a central body portion and a plurality of arms radially extending from the central body portion, each pair of

adjacent arms defining a *channel*.” (A31-A40, ’061 Patent, at 7:6-24.) Claim 12 similarly includes “a dielectric interior support having a central body portion and a plurality of arms extending from the central body portion, each pair of adjacent arms of the plurality of arms defining a *channel*.” (A31-A40, ’061 Patent, at 7:35-8:3.)

2. “Twisted Together”

As acknowledged in the Board’s Final Written Decision, the separator “grooves [] accommodate twisted pair conductors allowing for easy spacing of the twisted pairs that improves near-end cross-talk (NEXT) and lessens the need for complex and hard to control lay procedures and individual shielding” of the twisted conductor pairs. (A1-A26 at A3; A31-A40, ’061 Patent, at 1:28-29, 55-63.)

The “complex and hard to lay procedures” that the Board referenced correspond to the process by which “the pair separator/interior support [] is [] helically twisted along with the twisted pairs, about a common axis, as a result of the so-called ‘cabling’ process that is used to close the ’061 Patent’s cable.” (A494-A510, ¶ 33.) The ’061 Patent explains that, once “cabled” with the twisted conductor pairs, the separator will have a “helixed or S-Z configuration.” (A31-

A40, '061 Patent, at 5:18-22, 6:19-23; A494-A510, ¶ 33; A463-A485 at A469-A470, A473-A482.)

As shown by the language highlighted below, claim 1 requires that the twisted pairs and the pair separator are twisted together:

1. A communications cable comprising:
 - a plurality of twisted pairs that carry communications signals;
 - a pair separator disposed among the plurality of twisted pairs, the pair separator comprising a central body portion and a plurality of arms radially extending from the central body portion, each pair of adjacent arms defining a channel; and
 - a cable covering surrounding the plurality of twisted pairs and the pair separator along the length of the cable;wherein at least one twisted pair of the plurality of twisted pairs is respectively located in the channel defined by each pair of adjacent arms;
 - wherein the plurality of twisted pairs and the pair separator are helically twisted together along the length of the cable;*** and
 - wherein the cable covering does not include an electrically conductive shield.

(A31-A40, '061 Patent, at 6:42-59) (emphasis added).

In addition, similar to claim 1, independent claims 12 and 19 require the plurality of transmission media and the separator or interior support to be helically twisted together along the length of the cable. (A31-A40, '061 Patent, at 7:35-8:3, 8:22-40; A463-A485 at A473-A475.) Claim 12 states “wherein the plurality of

twisted pairs and the dielectric interior support are helically twisted together along the length of the data communications cable.” (A31-A40, ’061 Patent, at 7:35-8:3.) Claim 19 similarly provides “wherein the plurality of twisted pairs and the interior support are helically twisted together along the length of the data communications cable.” (A31-A40, ’061 Patent, at 8:22-43.)

As discussed below, the Board instituted the IPR and rendered its adverse Final Written Decision even though the primary reference, Tessier ’046, included neither the claimed “channels,” nor transmission media “twisted together” with the interior support.

C. THE *INTER PARTES* REVIEW OF THE ’061 PATENT

1. The Board’s Decision Instituting IPR”

a. The Tessier ’046 Reference

Each of the Grounds in the IPR on relied on Tessier ’046. (A432-A433.) The reference describes a cable with a “core member 22” disposed between twisted conductor pair transmission media. (A167-A180, Tessier ’046, at 4:14-17, 4:27-29.)

Unlike the ’061 Patent, the projections of Tessier ’046’s core member, depicted below in cross-sectional Figures 2 and 3, do not extend near the cable jacket:

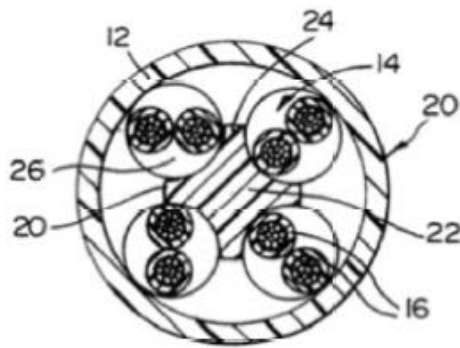


FIG. 2

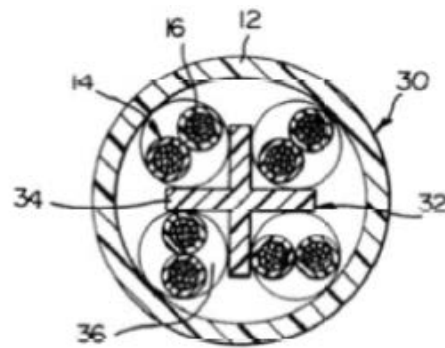


FIG. 3

(A167-A180, Tessier '046 at A478-A479)

In addition, unlike the '061 Patent, Tessier '046 teaches that its projections are *preformed* helixes that extend longitudinally along the length of the cable.

(A167-A180, Tessier '046, at 4:14-17, 4:27-29.)

For example, with respect to its second embodiment, which has the core member 20, Tessier '046 explains that “[t]he projections 24 and thus the recesses 26 *extend in helical fashion along the core member 20* to allow the pairs 14 to lie within the recesses in stranded fashion.” (A167-A180, Tessier '046, at 4:14-17.)

With respect to the third embodiment, which has the body 32, Tessier '046 explains that “the central core member 20 of the second embodiment is replaced by a spacer means in the form of *a body 32 formed by four helically extending spokes 34.*” (A167-A180, Tessier '046 at 4:27-29.)

b. The Board Instituted IPR Without Addressing the Differences Between the '061 Patent and the Prior Art

In its Order Instituting the IPR, the Board stated that “the claim terms have their ordinary and accustomed meaning from the perspective of one with ordinary skill in the art.” (A424-A425.) Berk-Tek, however, did not rely on any testimony of a person of ordinary skill in the art in support of its Petition, and the Board noted that “Berk-Tek also does not propose any special construction of any claim term.” (A424-A425.)

With respect to “channels,” the Board stated that in Tessier '046 “the conductors 16 are arranged within recesses (26 and 36) that lie in between the projections or spokes.” (A425-A429 at A426.)

With respect to “twisting together” in Tessier '046, the Board stated only that Tessier '046 included “a spacer means in the form of a body 32 formed by four helically extending spokes 34.” (A426.)

Without further discussion of those items, the Board was “persuaded that Berk-Tek has shown a reasonable likelihood that it would prevail in its assertion that claims 1-5 and 7-20 are anticipated by Tessier '046.” (A428.)

With regard to Ground 2, claim 6 of the '061 Patent depends from claim 1 and adds “wherein the communications cable is about 0.300 to 0.400 i[n]

diameter.” The Board concluded that “a person of ordinary skill in the art would have understood that the particular diameter values that are encompassed by claim 6 are known for the diameter of telecommunications cables.” (A428-A432 at A429; A31-A40, ’061 Patent, at 3:10-11.) Although the Petition supplied no testimony of a person of ordinary skill in the art, the Board concluded that “Berk-Tek has demonstrated a reasonable likelihood that it will prevail in its contention that claim 6 would have been obvious over Tessier ’046 and Meer ’417.” (A430.)

With respect to Ground 3, claim 21 depends from claim 7 and adds “wherein the pair separator and the plurality of twisted pairs are cabled in an S-Z configuration.” (A31-A40, ’061 Patent, at 5:18-19.) To be cabled in an S-Z configuration, the twist imparted on the pair separator and twisted conductor pairs is reversed at intervals during the cabling operation. Again, without the support of any testimony of a person of ordinary skill in the art, the Board concluded that “[w]e are [] persuaded that a skilled artisan would have appreciated readily that an S-Z arrangement, as is set forth in JP ’307, is suitable option for the cable of Tessier ’046.” (A431.) The Board stated that “the core components of Tessier ’046’s cables are understood seemingly as being in an S-Z configuration” (A430), but did not explain why Tessier ’046’s *preformed* helical core would be S-Z stranded.

2. Belden's Response

In its response, Belden's explained that the Board misapprehended the meaning of the '061 Patent's "channels," as well as the meaning of "wherein the plurality of twisted pairs and the pair separator are helically twisted together along the length of the cable."

a. "Channels"

With the support of Mr. Gareis testimony, Belden's Response explained that, in the context of the claims of the '061 Patent, term "channels" was a region that is at least substantially separated by the pair separator/interior support, such that a substantially enclosed passage is formed in the cable. (A463-A485 at A475-A480; A494-A510, ¶ 18-28.)

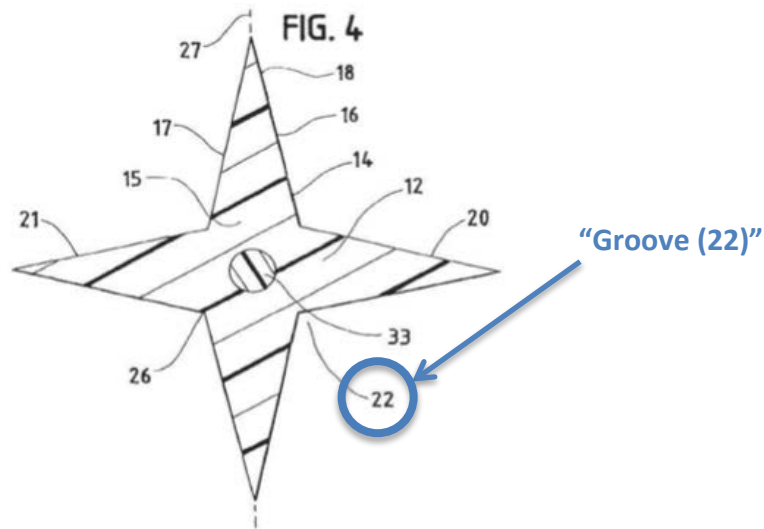
Each of independent claims 1, 7, and 12 recite "a pair separator" with adjacent arms that define a "channel" in the finished cable, which includes a cable "jacket" or "cable covering," and twisted pairs that are individually disposed in each channel. (A31-A40, '061 Patent, at 6:42-59, 7:6-24, 7:35-8:3.) This enclosed channel is created by constructing the pair separator to have arms that are dimensioned to extend near the outer cable jacket or covering, as shown in Figure 1 of the '061 Patent, which is reproduced above. (A31-A40, '061 Patent, at A34; *see also id.* at 3:20-21 (explaining that "in the finished cable, "[a]djacent splines

are separated from each other to provide a cable chamber”).) There is no “channel” in the ’061 Patent that is not substantially enclosed. (A463-A485 at A475-A480.)

Notably, the claimed substantially enclosed channel configuration is not an arbitrary feature of the ’061 Patent’s cable. Mr. Gareis testified that “[t]he channel-creating separator configuration claimed in the ’061 Patent provides the cable with additional crush resistance and helps to ensure that the twisted conductor pairs maintain spatial separation.” (A494-A510, ¶ 26; A31-A40, ’061 Patent at 6:19-21 (“The crush resistance of applicants’ star separator helps preserve the spacing of the twisted pairs, and control twisted pair geometry relative to other cable components”).)

Belden’s Response explained that the ’061 Patent’s use of the term “channel” matches dictionary definitions of the word. (*See* A463-A485 at A476; A486-A489 (Webster’s New Collegiate Dictionary 184 (1981) (defining a channel as “a usually tubular enclosed passage: CONDUIT”)); A490-A493 (Webster’s Third New International Dictionary 374 (2002) (defining a channel as “an especially tubular enclosed passage: CONDUIT, PIPE, DUCT <the poison ~ in a snake’s fangs>”))).)

The Response further noted the '061 Patent's "channels" *must* be substantially enclosed passages, because the specification explains that "[e]ach pair of adjacent [pair separator] splines defines a groove (22)." (A31-A40, '061 Patent, at 4:42; A463-A485 at A477-A478; A494-A510, ¶ 25.) The "grooves" formed by adjacent separator arms are illustrated in Figure 4 (A31-A40, '061 Patent, at A35):



Thus, when considering the pair separator alone (without a jacket or cable covering), the area between separator prongs is a "groove," and the term "channel" is reserved in the patent for describing the substantially enclosed space that is formed when the jacket is closed around the arms to enclose the twisted pairs. (A463-A485 at A476-A478; A494-A510, ¶ 18-28.)

Belden further explained that the difference between "channels" and "grooves" is also confirmed by the use of the terms in separate claims of the '061

Patent. (A463-A485 at A477-A478; A494-A510, ¶ 25.) Where claims 1, 7, and 12 recite “channels,” independent claim 19 recites “an interior support” with a “plurality of pairs of adjacent arms defining a corresponding plurality of *grooves*.” (A31-A40, ’061 Patent, at 8:22-43.)

For these reasons, Belden’s Response explained that one of skill in the art would have understood “channel,” as used in the ’061 Patent, to mean a region that is at least substantially separated by the pair separator/interior support, such that a substantially enclosed passage is formed in the cable. (A463-A485 at A475-A480; *see also* A494-A510, ¶ 25.)

With respect to Ground 1, Belden’s Response first explained that Tessier ’046 could not anticipate because it failed to disclose an interior support or separator with adjacent arms that define “channels,” as required by the claims. (A463-A485 at A475-A480.)

Mr. Gareis testified that “[a] person of ordinary skill in the art would understand that the cables of Tessier ’046’s Figures 2 and 3 do not have channels,” rather “they have one large cylindrical channel, the core member 20 being located in the center.” (A494-A510, ¶ 27.)

The Response explained that, comparing Figure 1 of the ’061 Patent to Figures 2 and 3 of Tessier ’046, “it becomes clear that the projections 24 and

spokes 34 [of Tessier '046] do **not** define “channels” in the cables, in contrast to the '061 Patent” (A463-A485 at A478-A479):

<p>'061 Patent, Figure 1</p> <p>Clearly defined <i>channels</i> created by the pair separator/interior support.</p>	
<p>Tessier '046, Figure 2</p> <p>The central core member 22 of does not form channels.</p>	
<p>Tessier '046, Figure 3</p> <p>The body 32 does not form channels.</p>	

As Mr. Gareis further explained “[t]he projections 24 and spokes 34 of Tessier ’046 do not “define” the cylindrical channel, or any other substantially enclosed channel.” (A494-A510, ¶ 28.)

Finally, Mr. Gareis explained that “Tessier ’046 also does not suggest that its cable might be modified so that the projections 24 or spokes 34 do define channels in the cable” and that, “[i]n fact, Tessier ’046 does not recognize that extending the projections 24 or spokes 34 would have any effect on the performance of the cable.” (A494-A510, ¶ 29.)

b. “Plurality of Twisted Pairs and the Pair Separator Are Helically Twisted Together”

Claim 1 of the ’061 Patent requires that “the plurality of twisted pairs and the pair separator are helically twisted together along the length of the cable.” Claim 12 similarly states that “the plurality of twisted pairs and the dielectric interior support are helically twisted together along the length of the data communications cable,” and claim 19 requires that “the plurality of twisted pairs and the interior support are helically twisted together along the length of the data communications cable.” (A31-A40, ’061 Patent, at 6:42-8:48.)

As Mr. Gareis testified, “the separator/interior support of claims 1, 12, and 19 of the ’061 Patent is formed such that the arms extend linearly in an axial direction along the length of the pair separator/interior support, and is then

helically twisted along with the twisted pairs, about a common axis, as a result of the so-called ‘cabling’ process that is used to close the ’061 Patent’s cable.”

(A494-A510, ¶ 33.) The pair separator is twisted with the transmission media so as to improve the flexibility of the finished cable and ensure that the twisted conductor pairs are securely intertwined with the pair separator. (A31-A40, ’061 Patent, at 6:21-23 (“Further, adding a helical or S-Z twist improves flexibility while preserving geometry.”).)

Belden’s Response explained that Tessier ’046’s core member 22 and body 32 were *formed as helixes* (A167-A180, Tessier ’046, at 4:14-17, 4:27-29), meaning that its core member 22 and body 32 were not “*helically twisted together* [with the twisted pairs] along the length of the” cable, as in the ’061 Patent. (A31-A40, ’061 Patent, at 6:42-8:48; A463-A485 at A480-A482.)

Regarding Tessier ’046’s second embodiment (with the core member 20), the reference explains that “[t]he projections 24 and thus the recesses 26 *extend in helical fashion along the core member 20* to allow the pairs 14 to lie within the recesses in stranded fashion.” (A167-A180, Tessier ’046, at 4:14-17; A463-A485 at A481.) Similarly, in its third embodiment, Tessier ’046 states that “the central core member 20 of the second embodiment is replaced by a spacer means in the

form of *a body 32 formed by four helically extending spokes 34.*” (A167-A180, Tessier ’046, at 4:27-29; A463-A485 at A481.)

Mr. Gareis testified that “[f]rom these descriptions, it would be understood by a person of skill in the art that the core member 20 and body 32 are *pre*-formed with the projections 24 or spokes 34 *already extending helically along the core member*” (emphasis added). (A494-A510, ¶ 32; A167-A180, Tessier ’046, at 4:14-17, 4:27-29; A463-A485 at A481.) In other words, Tessier ’046’s core member/body is manufactured by extruding the core member/body such that it has a helical geometry even before it is wrapped in the jacket 12. (*See, e.g.*, A167-A180, Tessier ’046, at A178-A179; A463-A485 at A481-A482.) This means that the core member/body of Tessier ’046 is *not* twisted together with the insulated pairs 14 along the length of the cable. (A167-A180, Tessier ’046, at A178-A179, 4:14-17, 4:27-29; A494-A510, ¶ 32-33; A463-A485 at A481-A482.)

Thus, Tessier ’046 is not the same as what is claimed in claims 1, 12 and 19 of the ’061 Patent. (A463-A485 at A480-A482.) In contrast to the core member of Tessier ’046, the separator/interior support of claims 1, 12 and 19 of the ’061 Patent is formed such that the arms extend linearly in an axial direction along the length of the pair separator/interior support, and is then helically twisted along with the twisted pairs, about a common axis, as a result of the so-called “cabling”

process that is used to close the '061 Patent's cable. (A494-A510, ¶ 33; A463-A485 at A480-A482.)

c. Ground 2

For Ground 2, Belden's Response explained that dependent claim 6 was not unpatentable for the reasons identified with respect to its independent claim 1. (A463-A485 at A482; A429; A494-A510, ¶¶ 35-38.)

d. Ground 3

Claim 21 of the '061 Patent depends from independent claim 7, and adds that "the pair separator and the plurality of twisted pairs are cabled in an S-Z configuration." (A31-A40, '061 Patent, at 46-48.) As noted above, to be cabled in an "S-Z" configuration means that the twist imparted on the pair separator and twisted conductor pairs is reversed at intervals during the cabling operation.

Belden's Response explained that JP '307 was of record during prosecution of the '061 Patent (*see* A31-A40, '061 Patent, at A32), and does not remedy the deficiencies of Tessier '046 discussed above with respect to claim 7 because it lacks a channel. (A463-A485 at A483; A494-A510, ¶¶ 39-44.)

In addition, Mr. Gareis testified that "[a] person of ordinary skill in the art would recognize that the 'core member' of Tessier '046 with its *pre-formed* structure would not be S-Z stranded together with the twisted conductor pairs, due

to difficulty of aligning the twisted conductor pairs with the grooves of Tessier '046's pre-formed 'core member' during the high-speed manufacturing operation.” (A494-A510, ¶ 42 (emphasis added); A463-A485 at A481.)

3. Berk-Tek's Reply

Berk-Tek did not seek to cross-examine Mr. Gareis and did not provide a rebuttal declaration from an expert or from person of ordinary skill in the art with its Reply. *See* 37 C.F.R. § 42.51. As a result, the Reply did not include *any* evidence from a person of ordinary skill in the art rebutting Mr. Gareis' testimony regarding the meaning of the '061 Patent's claims or a person of skill in the art's understanding of Tessier '061, which formed the bases for eight of nine purported grounds for unpatentability

a. “Channels”

Berk-Tek's Reply responded to Mr. Gareis' testimony with attorney argument only. For example, regarding the '061 Patent's “channels,” Berk-Tek asserted that Mr. Gareis' explanation was of the term was wrong because “[t]he only example in the specification showing the closed cable, Figure 1, illustrates ‘entirely enclosed’ channels,” such that “[s]ubstantially enclosed’ has no meaning or support within the context of the present proceedings.” (A520.)

Berk-Tek next argued that “the specification allows for a reading of channel that is *not* substantially enclosed” because the text associated with Fig. 3 discusses variable ratios for the dimensions of the separator arms. (A521-A522.) The cited portion of the ’061 Patent, however, merely identifies the various possible dimensions of the star separator; Berk-Tek’s assertion that this “necessarily impl[ies]” that its arms do not reach the cable jacket was nothing more than conjecture. (A31-A40, ’061 Patent, at 4:49-64; A521-A522.)

Berk-Tek also attempted to discount the dictionary definitions of the term “channel” identified in Belden’s Response, asserting that “the general meanings gleaned from a dictionary must always be compared against the use of the terms in context.” (A522-A523.) The “context,” however, is the ’061 Patent, in which, again, every embodiment has substantially enclosed channels. (A31-A40, ’061 Patent, at A34; A494-A510, ¶¶ 18-28.)

Berk-Tek then argued that “channel” and “groove” are synonymous because claim 9 states “that the pairs are ‘located in each groove’ implying that both ‘groove’ and ‘channel’ are intended to be spaces in which something (a pair) can be located.” (A523.) But it does not follow from the fact that a twisted pair could be described as being located in a channel or in a groove, that the terms are synonymous.

Next, Berk-Tek looked to U.S. Patent No. 7,977,575 (the “’575 Patent”), the child of the ’061 Patent. (A525-A526.) The argument was that, because independent claim 1 recited “channels,” and because dependent claim 2 included “projections extending radially outward from the longitudinally extending central portion to at least an outer boundary defined by an outer dimension of the twisted pair conductors,” Mr. Gareis’ “interpretation of ‘channel’ would mean that claim 1 of the ’575 would be would be *narrower* than claim 2.” (A526.) That is incorrect. Claim 2 of the ’575 Patent depends from claim 1 and further states that the “projections extend[] radially outward from the longitudinally extending central portion to at least an outer boundary defined by an outer dimension of the twisted pair conductors.” (A525; U.S. Patent No. 7,977,575 at 7:4-10.) The additional requirement that the interior support projections extend “to at least an outer boundary defined by *an outer dimension of the twisted pair conductors*” has nothing to do with whether *the channels* are substantially enclosed. Furthermore, claim 2 recites additional matter, *e.g.*, that the interior support includes a “longitudinally extending central portion,” that narrows the scope of the claim.

Finally, Berk-Tek argued that Tessier ’046 taught “substantially enclosed” channels because the reference states “the projections cold extend further towards the jacket,” but failed to explain why or how that bare statement would be

understood by a person of ordinary skill in the art to show substantially enclosed channels. (A527.)

b. “Plurality of Twisted Pairs and the Pair Separator Are Helically Twisted Together”

With regard to the requirement that the “plurality of twisted pairs and the pair separator are helically twisted together,” Berk-Tek’s Reply again provided only incorrect attorney argument.

For example, Berk-Tek criticized Mr. Gareis’ testimony, claiming that he “erroneously cite[d] to ’061’s ‘so-called ‘cabling’ process that is used to close the cable’ even though neither the claims of ’061 nor the specification describe or claim a ‘process.’” (A528-A529.) That misses the point, which is that, in claiming a “plurality of twisted pairs and [a] pair separator [that] are helically twisted together,” the applicant claimed a particular structure (one “helically twisted together”) that necessarily results from the cabling process.

Berk-Tek next made arguments based on a perceived lack of a twisting step in claims 1, 12 and 19 of the ’061 Patent. (A528-A529.) According to Berk-Tek, “it is irrelevant if [Tessier] ’046 twists the pairs and separator together or pre-twists the separator and then applies the pairs. The net result in both cases is a product that has exactly the same structure.” (A529.) Again, however, Berk-Tek provided no testimony of a person of ordinary skill in the art to support this assertion. In

fact, it is evident that twisting the '061 transmission media and separator together would distort them from their original shape, causing the entire structure to twist and store potential energy that, for example, would cause it to unwind if released and alter the flexibility characteristics.

c. Grounds 2 and 3

As to Ground 2, Berk-Tek simply argued that claim 6 of the '061 Patent was invalid for the same incorrect reasons identified with respect to Ground 1.

For Ground 3, again without the support of testimony of a person of ordinary skill in the art (or any specific citation to any documents in the IPR record), Berk-Tek wrongly asserted that Tessier '046 could have been S-Z stranded because it “does not have a pre-formed helical separator.” (A530.)

4. The Board's Final Written Decision

The Board's Final Written Decision incorrectly interpreted the claims of the '061 Patent and the teachings of the prior art references, and adopted arguments that were not properly set forth in Berk-Tek's Petition.

a. “Channels”

In its Final Written Decision, the Board first construed the term “channels” by citing the claims of U.S. Patent No. 7,339,116 (the “'116 Patent”), which is the parent of the '061 Patent. (A1-A26 at A7-A9.)

According to the Board, because the '116 Patent's independent claim 1 recites a separator with projections that define an "open space," and because the '116 Patent's dependent claim 3 states that the open space is selected from "a group consisting of a channel, a groove, a duct, and a passage," the "channel" and "groove" are the same "open space" in the '061 Patent. (A1-A26 at A8-A9.) The Board adopted this argument even though it conflicted with Mr. Gareis' unrebutted declaration, and even though it was not presented in Berk-Tek's Petition, *meaning that Belden never had any opportunity to address it.*

The Board next criticized Belden's testimony and evidence concerning the meaning of "channels" in the '061 Patent, claiming that "channels" could not mean substantially enclosed regions because "each of the independent claims calls for the separator to define the channels, not the separator support in combination with the jacket." (A1-A26 at A11; *see also id.* at A12-A13.) The Board, however, failed to acknowledge that each of independent claims 1, 7, and 12 *also recite a cable jacket or covering*, within which the separator is disposed so that its arms can define enclosed channels, as Mr. Gareis testified, and as is depicted in Figure 1 of the '061 Patent.

The Board next completely disregarded Mr. Gareis' testimony, stating that "the intrinsic evidence as to the meaning of the claim term 'channel' is

unambiguous so that we need not resort to expert testimony.” (A1-A26 at A13.) Thus, the Board disregarded Mr. Gareis’ declaration even though the claims must be interpreted from the perspective of a person of ordinary skill in the art, like Mr. Gareis, whose testimony was *unrebutted*.

Even though Mr. Gareis presented sixteen pages of detailed testimony about his patent (*see* A494-A510, ¶¶ 18-28), and the testimony was *unchallenged*, the Board simply ignored it on the grounds that it was “conclusory in that it is not supported by a citation to the Specification nor an ordinary meaning.” (A1-A26 at A13.)

b. “Plurality of Twisted Pairs and the Pair Separator Are Helically Twisted Together”

The Final Written Decision states that “[t]he claims do not recite that the claimed structure is the structure produced by twisting the twisted pairs along with the interior support.” (A1-A26 at A15.) The Board did not explain how that statement could be correct given that the claims specifically require that the “plurality of twisted pairs and the pair separator are *helically twisted together*.” (*See, e.g.*, A31-A40, ’061 Patent, at 6:55-57 (emphasis added).)

The Board rejected Mr. Gareis’ testimony regarding the cabling process (*i.e.*, that it involved helically twisting the conductor pairs and separator together about a common axis), concluding instead that “the ’061 Patent describes that being

‘cabled’ defines grooves in the separator.” (A1-A26 at A16.) In reaching that conclusion, the Board plainly read out-of-context a portion of the ’061 Patent that describes the shape of its separator *after cabling*. (A31-A40, ’061 Patent, at 5:18-22, 6:19-23) and simply ignored unrebutted testimony from the only person of skill in the art to offer evidence about what cabling actually is.

With regard to Belden’s argument “that helically twisting the twisted pairs along with the interior support, as opposed to separately twisting the components and intertwining them, produces a different structure,” the Board’s Final Written Decision stated that there was “no evidence before us that the structures resulting from these two processes differ.” (A1-A26 at A17.) This improperly shifted the burden to Belden to show that the prior art was different, when the burden should have been on Berk-Tek to show that the prior art met the claim limitation. It was also wrong, as JP ’470’s separator is pre-formed and the reference specifically distinguishes its cable from the structure of cables with transmission media that are twisted together with a separator, as the ’575 Patent claims. (A167-A180, Tessier ’046, at A168.)

c. Ground 2

The Board found that claim 6 was unpatentable. (A1-A26 at A22-A23.)

d. Ground 3

Claim 21 depends from claim 19 and adds that the cable components are S-Z stranded. The Final Written Decision stated only that “[t]he Patent Owner is applying the argument against claim 21 by virtue of its dependence from independent claim 19,” and declared that the Belden’s arguments were unpersuasive. (A1-A26 at A24.)

The Board, however, neglected to address argument and evidence, including Mr. Gareis’ ***unchallenged*** testimony, that “a person of ordinary skill in the art would recognize that the ‘core member’ of Tessier ’046 with its pre-formed structure would not be S-Z stranded together with the twisted conductor pairs, due to difficult of aligning the twisted conductor pairs with the grooves of Tessier ’046’s pre-formed ‘core member’ during the high-speed manufacturing operation. (A494-A510, ¶ 42; A463-A485 at A483.)

VI. SUMMARY OF THE ARGUMENT

The Board is statutorily authorized to institute IPR on grounds that are properly set forth in a petition. *See, e.g.*, 35 U.S.C. § 314(a); 37 C.F.R. §§ 42.2 and 42.104. Here, the Board instituted the IPR even though Berk-Tek’s Petition was supported with attorney argument alone. In particular, Berk-Tek failed to offer ***any*** testimony of a person of ordinary skill in the art (or any other evidence)

about the meaning of the '061 Patent's claims to person of ordinary skill, or about the teachings of the prior art. As a consequence, the Grounds upon which the Board instituted the IPR were based on misreading of both the '061 Patent and the prior art references.

Belden's Response, with the support of Mr. Gareis' testimony, identified the errors of the Petition and the Board's Institution Decision.

In particular, the Response showed that the term "channels," as used in the '061 Patent, would have been understood by a person of ordinary skill in the art to be a region that is at least substantially separated by the pair separator/interior support, such that a substantially enclosed passage is formed in the cable. This feature was absent in Tessier '046, the primary reference in every Ground.

In addition, Tessier '046 does not teach a cable "wherein the plurality of twisted pairs and the pair separator are helically twisted together along the length of the cable." Instead, Tessier '046's cable had a separator with a *preformed* helical shape; it was not a separator with linear channels that was *twisted together* with the transmission media.

Moreover, Belden showed that it would make no sense to apply S-Z stranding to a structure with a *preformed* helical shape.

Even though the Board’s Final Written Decision was required to be supported by sound legal reasoning and substantial evidence, the Board inexplicably discounted Belden’s *uncontroverted* evidence regarding the meaning of the claims and the teachings of the prior art, in favor of Berk-Tek’s unsupported attorney argument. Berk-Tek did not attempt to contest Mr. Gareis’ declaration by seeking to cross-examine him, nor did Ber-Tek offer testimony from its own expert.

Additionally, the Board’s construction of “channels” resulted from an analysis that appeared *for the first time in the Final Written Decision*, improperly and unfairly depriving Belden of any opportunity to respond to it.

For these reasons, and as further discussed below, the Board’s Decision with respect to each of its purported Grounds for unpatentability should be reversed.

VII. ARGUMENT

A. STANDARD OF REVIEW

In an IPR, “the petitioner [has] the burden of proving a proposition of unpatentability by a preponderance of the evidence.” 35 U.S.C. § 316(e).

The Federal Circuit “reviews the Board’s legal conclusions *de novo* and its factual findings for substantial evidence.” *Tempo Lighting, Inc. v. Tivoli, LLC*, 742 F.3d 973, 976-7 (Fed. Cir. 2014). Claim construction is a question of law that the

Federal Circuit reviews without deference. *See, e.g., In re NTP, Inc.*, 654 F.3d 1268, 1273 (Fed. Cir. 2011).

“Claims should always be read in light of the specification and teachings in the underlying patent.” *In re Suitco Surface, Inc.*, 603 F.3d 1255, 1260 (Fed. Cir. 2010) (citing *Schiber-Schroth Co. v. Cleveland Trust Co.*, 311 U.S. 211, 217 (1940)).

Anticipation is a question of fact that is reviewed for substantial evidence. *See, e.g., In Suitco Surface, Inc.*, 606 F.3d at 1259. “A claim is anticipated only if each and every element as set forth in the claim is found . . . in a single prior art reference.” *Verdegaal Bros. v. Union Oil Co. of Cal.*, 814 F.2d 628, 631 (Fed. Cir. 1987). Moreover, “[t]he identical invention must be shown in as complete detail as is contained in the . . . claim.” MPEP § 2131 (citing *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236 (Fed. Cir. 1989)). The elements must be arranged as required by the claim, *see In re Bond*, 910 F.2d 831, 832 (Fed. Cir. 1990), and “[a]ll words in a claim must be considered in judging the patentability of that claim against the prior art.” MPEP § 2143.03 (citing *In re Wilson*, 424 F.2d 1382, 1385 (CCPA 1970)).

“Whether a claimed invention is unpatentable as obvious under § 103 is a question of law based on underlying findings of fact.” *In re Gartside*, 203 F.3d

1305, 1316 (Fed. Cir. 2000). The Board’s legal conclusion of obviousness is reviewed *de novo*, while its factual findings are reviewed for substantial evidence, where substantial evidence is “such relevant evidence as a reasonable mind might accept as adequate to support a conclusion.” *Consol. Edison Co. v. N.L.R.B.*, 305 U.S. 197, 229 (1938). “The presence or absence of a motivation to combine references in an obviousness determination is a pure question of fact.” *Id.*

“An agency’s interpretation of its regulations is neither entitled to deference nor given controlling weight if it is ‘plainly erroneous or inconsistent with the regulation’ itself.” *AMS Assocs. v. U.S.*, 737 F.3d 1338, 1343 (Fed. Cir. 2013) (quoting *Bowles v. Seminole Rock & Sand Co.*, 325 U.S. 410, 414 (1945)).

B. THE BOARD ERRED IN HOLDING THAT CLAIMS 1-5 AND 7-20 WERE ANTICIPATED

With respect to Ground 1, the Board’s anticipation holding is erroneous for at least two reasons. First, the Board’s Decision relied on an improper and erroneous interpretation of the term “channels” in claims 1, 2, and 12 of the ’061 Patent. Second, the Board relied on an erroneous interpretation of “the plurality of twisted pairs and the interior support are helically twisted together along the length of cable” in claims 1, 12, and 19.

1. The Board Incorrectly Interpreted “Channels”

a. Belden Was Never Afforded An Opportunity To Address The Reasoning Used By The Board To Interpret This Term

In its Order Instituting the IPR, the Board determined that “the claim terms have their ordinary and accustomed meaning from the perspective of one with ordinary skill in the art.” (A424-A425.)

Berk-Tek, however, did not rely on any testimony of a person of ordinary skill in the art in support of its Petition, and the Board noted that “Berk-Tek also does not propose any special construction of any claim term.” (A425.)

In its Response, Belden offered Mr. Gareis’ declaration to support its argument that “channels” should be interpreted to mean “a region that is at least substantially separated by the pair separator/interior support, such that a substantially enclosed passage is formed in the cable.” (A494-A510, ¶ 25.) Berk-Tek’s Reply made a variety of arguments concerning the proper construction of “channels,” but made no reference to the ’116 Patent. (A519-A527.)

In the Final Written Decision, however, the Board adopted *new* reasoning regarding the interpretation of the term “channels” that was based on the claims of the ’116 Patent, which was the grandparent of the ’575 Patent. (A1-A26 at A7-A9.) In particular, the Board observed that claim 1 of the ’116 Patent recites a

separator with projections that define an “open space” and concluded that, because dependent claim 3 of that patent states that the open space is selected from “a group consisting of a channel, a groove, a duct, and a passage,” the “channel” and “groove” are the “open space” in the ’061 Patent. (A1-A26 at A8-A9.) The Board adopted this analysis (which was wrong, as explained below) even though it was based on entirely different claims, in a different patent, and even though it conflicted with Mr. Gareis’ unrebutted testimony.

Because *the Board based its decision on rationale that Belden never had a chance to address*, the Board’s Final Written Decision regarding unpatentability of claims 1, 17, and 24 (and their dependent claims) was legally erroneous and should be reversed. *See, e.g., Rambus Inc. v. Rea*, 731 F.3d 1248, 1256 (Fed. Cir. 2013) (holding, in an *inter partes* reexamination, that the Board committed reversible error by adopting a new motivation to combine to which the patent owner did not have a fair opportunity to respond); *In re Stepan Co.*, 660 F.3d 1341, 1345 (Fed. Cir. 2011) (“Allowing the Board unfettered discretion to designate a new ground of rejection—when it relies upon facts or legal argument not advanced by the examiner—would frustrate the notice requirements of the APA.”).

b. “Channels” Means a Region That Is at Least Substantially Separated by the Pair Separator/Interior Support, Such That a Substantially Enclosed Passage Is Formed in the Cable

The Board misconstrued the claim term “channels” by reading it out of context and by incorrectly relying on the claims of the parent ’116 Patent, which contain different limitations from those of the ’061 Patent, and which the Board misread. And, in conducting its analysis, the Board improperly ignored Mr. Gareis’ un rebutted testimony.

The fundamental problem is that the Board interpreted “channel” to mean the same thing as “groove.” That is demonstrably wrong.

That “channels” and “grooves” are different is confirmed by the fact that the area between separator prongs is a “groove” in the ’061 Patent when considering the separator alone, while the term “channel” is reserved for describing the substantially enclosed space that is formed when the jacket is closed around the prongs to enclose the twisted pairs. (A463-A485 at A476-A478; A494-A510, ¶¶ 18-28.) There is no “channel” in the ’061 Patent that is not enclosed by the jacket.

The claims of the ’116 Patent also support Belden’s interpretation, as claims 1, 7, and 12 have “channels,” while claim 19 has “an interior support” with a “plurality of pairs of adjacent arms defining a corresponding plurality of *grooves*.”

(A680-A688, '116 Patent, at 8:22-43; A494-A510, ¶ 25; A463-A485 at A477-A478.)

“There is presumed to be a difference in meaning and scope when different words or phrases are used in separate claims.” *Comark Comm., Inc. v. Harris Corp.*, 156 F.3d 1182, 1187 (Fed. Cir. 1998). In order to overcome this presumption, Berk-Tek or the Board were required to identify something in the record demonstrating that “channels” and “grooves” should be read synonymously. *See, e.g., id.*; *see also Am. Piledriving Equip., Inc. v. Geoquip, Inc.*, 637 F.3d 1324, 1335 (Fed. Cir. 2011). No such evidence was identified.

To the contrary, at the IPR trial, Berk-Tek’s counsel admitted that the outer jacket maintains the transmission media in the channels, and that a “groove” does not require that:

MR. SOFER: Well, what the—obviously if we don’t have an outer jacket, you know, these things are free to sort of get out of their recesses. ***So, outer jacket is maintaining them, but it’s maintaining them within the recess that is defined by the channel.***

JUDGE LEE: Yeah, but in the context of a groove, are you saying—I did not understand you to be saying that the jacket has anything to do with the groove. Is that true?

MR. SOFER: Well, no, the jacket is providing the outer perimeter—perimeter within which, you know—

JUDGE LEE: Yeah, but a groove doesn't require an outer perimeter.

MR. SOFER: *No, groove doesn't require that.*

(A602-A604 at A693, 18:8-21.) Thus, Berk-Tek's counsel admitted that a "channel" was not the same thing as a "groove."

In its Final Written Decision, the Board specifically declined to consider Mr. Gareis' testimony, stating that "the intrinsic evidence as to the meaning of the claim term 'channel' is unambiguous so that we need not resort to expert testimony." (A1-A26 at A13.) The intrinsic evidence is not "unambiguous," however, at least because of the groove/channel issue.

But even if the intrinsic evidence *was* unambiguous, the claims still would need to be interpreted from the perspective of a person of ordinary skill in the art. *See, e.g., Ferguson Beauregard v. Mega Sys., LLC*, 350 F.3d 1327, 1338 (Fed. Cir. 2003) ("The words used in the claims must be considered in context and are examined through the viewing glass of a person skilled in the art."); *Interactive Gift Express, Inc. v. Compuserve Inc.*, 256 F.3d 1323, 1332 (Fed. Cir. 2001) ("It is important to bear in mind that the viewing glass through which the claims are construed is that of a person skilled in the art.").

In this instance, Mr. Gareis was the *only person of skill in the art to offer any testimony*. (One would assume that if Berk-Tek could have offered contrary

testimony from the perspective of one of skill in the art, it would have.) The Board provided no reason to ignore Mr. Gareis' declaration, which was not merely that of an "expert," but of a person of ordinary skill in the art.

Mr. Gareis described precisely why the "channels" in the '061 Patent would be regarded by a person of ordinary skill in the art as substantially enclosed. He explained that when considering the pair separator alone (without a jacket or cable covering), the '061 Patent identifies the area between separator prongs as a "groove," where the term "channel" is reserved for describing the substantially enclosed space that is formed when the jacket is closed around the arms to enclose the twisted pairs. (A463-A485 at A476-A478; A494-A510, ¶ 18-28.)

Moreover, the claimed substantially enclosed channel configuration is not an arbitrary feature of the '061 Patent's cable. As Mr. Gareis explained, "[t]he channel-creating separator configuration claimed in the '061 Patent provides the cable with additional crush resistance and helps to ensure that the twisted conductor pairs maintain spatial separation." (A494-A510, ¶ 26.)

Mr. Gareis testified that "[a] person of ordinary skill in the art would understand that the cables of Tessier '046's Figures 2 and 3 do not have channels" as the '061 Patent claims. (A494-A510, ¶¶ 26.) He further explained that Tessier '046's Figure 2 and 3 embodiments "have one large cylindrical channel" that is

neither substantially enclosed nor defined by the projections of its core member in the finished cable, which includes a jacket. (A494-A510, ¶¶ 27-28.)

Berk-Tek made no effort to depose Mr. Gareis, who is a current Belden employee. As Berk-Tek also failed to provide any contrary evidence, Mr. Gareis' explanation of how "channels" would be understood by a person of ordinary skill in the art, as well as his explanation of the teachings of Tessier '046, is *unrebutted*. See, e.g., *Monolithic Power Sys., Inc. v. O2 Micro Intern. Ltd.*, 558 F.3d 1341, 1350 (Fed. Cir. 2009) ("O2 Micro did not cross-examine Dr. Horenstein on his assertion as to this point, and O2 Micro's own expert did not testify on this subject at all. Thus, the record stands unrebutted with evidence showing that Henry included a flow-through switch.")

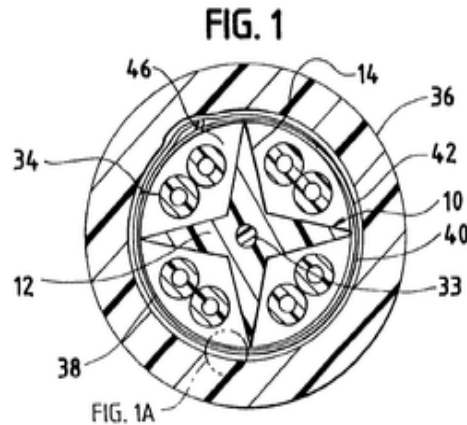
It was improper for the Board to simply ignore Mr. Gareis' testimony as unnecessary; instead, his unchallenged testimony should have been accepted.

Choosing instead to ignore both Mr. Gareis and the claims of the '061 Patent, the Board inexplicably turned to the '116 patent, pointing out that claim 1 of that patent recites a separator with projections that define an "open space," and that dependent claim 3 states that the open space is selected from "a group consisting of a channel, a groove, a duct, and a passage." The Board then

concluded that the “channel” and the “groove” are both the “open space” in the ’061 Patent. (A1-A26 at A8-A9.)

That approach was misguided, and the correct analysis confirms that the Board’s construction was, in fact, incorrect. Because the “open space” can be either a “channel” or a “groove,” those necessarily are not the same thing. An “open space” that was simply a *groove* would be like Tessier ’046, which has a core with shallow recesses. An “open space” that was a *channel* would be like the ’575 Patent, because its core forms a substantially enclosed space with the jacket, as shown in, for example, Figure 1.

Finally, the Board’s assertion that “each of the independent claims calls for the separator to define the channels, not the separator support in combination with the jacket” (A1-A26 at A11) cannot reasonably be squared with the claims themselves. Each of independent claims 1, 7, and 12 recites a cable jacket or covering, within which the separator is disposed such that its arms define substantially enclosed channels, as Mr. Gareis testified. The channels are defined by the arms of the separator *and the jacket*, as clearly illustrated in Fig. 1:



(A31-A40, '061 Patent at A34)

The only correct reading of the '061 Patent is that its “channels” are substantially enclosed. As there is no dispute that Tessier '046 lacks this feature, it cannot anticipate. (*See, e.g.*, A494-A510, ¶ 28; A463-A485 at A478-A480.) The Board’s anticipation rejection of independent claims 1, 7, and 17 and their dependent claims 2-5, 8-11, and 13-18 should be reversed.

2. The Board Relied on an Erroneous Interpretation of “Plurality of Twisted Conductor Pairs and the Pair Separator Are Helically Twisted Together Along the Length of Cable”

As indicated above, the Board’s Final Written Decision relied on an erroneous interpretation of “the plurality of twisted pairs and the interior support are helically twisted together along the length of cable” in claims 1, 12, and 19.

a. Claim Construction

The Board construed this claim language, concluding that “[t]he structure required by the claims is the twisted pairs and the interior support helically twisted together along the length of the cable, and the claims are not limited to a structure produced by a certain method of manufacture.” (A1-A26 at A15.) Belden was not arguing that the claims were limited to “a structure produced by a certain method of manufacture,” however. The point is that the *structure* is different and, in particular, that the cable of Tessier ’046 does not have a “plurality of twisted conductor pairs and the pair separator [that] are **helically twisted together** along the length of cable.”

b. Tessier ’046’s Separator Is a Helical Preform That Is Not Twisted Together with Transmission Media

Tessier ’046’s core member 22 and body 32 are **formed as helixes** (A167-A180, Tessier ’046, at 4:14-17, 4:27-29), meaning that its core member 22 and body 32 are not a structure that is “**helically twisted together** [with the twisted pairs] along the length of the” cable, as in the ’061 Patent. (A31-A40, ’061 Patent, at 6:42-8:48; A463-A485 at A480-A482.)

Regarding Tessier ’046’s second embodiment, the reference specifically states that “[t]he projections 24 and thus the recesses 26 **extend in helical fashion**

along the core member 20 to allow the pairs 14 to lie within the recesses in stranded fashion.” (A167-A180, Tessier ’046, at 4:14-17; A463-A485 at A481.) Similarly, for Tessier ’046’s third embodiment, the reference explains that “the central core member 20 of the second embodiment is replaced by a spacer means in the form of *a body 32 formed by four helically extending spokes 34*.” (A167-A180, Tessier ’046, at 4:27-29; A463-A485 at A481.)

Regarding the teachings of Tessier ’046, Mr. Gareis testified that “[f]rom these descriptions, it would be understood by a person of skill in the art that the core member 20 and body 32 are *pre*-formed with the projections 24 or spokes 34 *already extending helically along the core member*” (emphasis added). (A494-A510, ¶ 32; A167-A180, Tessier ’046, at 4:14-17, 4:27-29; A463-A485 at A481.) A person of ordinary skill in the art would have understood that Tessier ’046’s core member/body is manufactured by helically extruding the core member/body such that it has a helical geometry even before it is wrapped in the jacket 12. (*See, e.g.*, A167-A180, Tessier ’046, at A178-A179; A463-A485 at A481-A482.) As Mr. Gareis testified, the core member/body of Tessier ’046 is *not* twisted together with the insulated pairs 14 along the length of the cable. (A167-A180, Tessier ’046, at A178-A179, 4:14-17, 4:27-29; A494-A510, ¶ 32-33; A463-A485 at A481-A482.)

Therefore, Tessier '046 is not the same as what is claimed in claim 1, 12, and 19 of the '061 Patent. (A463-A485 at A480-A482.) In contrast to the core member of Tessier '046, the separator/interior support of claims 1, 12, and 19 is formed such that the arms extend linearly in an axial direction along the length of the pair separator/interior support, and is then helically twisted along with the twisted pairs, about a common axis, as a result of the so-called “cabling” process that is used to close the '061 Patent’s cable. (A494-A510, ¶ 33; A463-A485 at A480-A482.)

c. The Board Erroneously Found That the Structure of Tessier '046 Cable and the One Claimed in the '061 Patent Were the Same

The Final Written Decision incorrectly concluded that “[t]he claims do not recite that the claimed structure is the structure produced by twisting the twisted pairs along with the interior support.” (A1-A26 at A15.) That is wrong—the claims require that the “plurality of twisted pairs and the pair separator are helically twisted *together*.” (See, e.g., A31-A40, '061 Patent, at 6:55-57 (emphasis added).) Neither the Board, nor Berk-Tek offered any explanation as to how the cable components could be regarded as being *twisted together* if they were not actually *twisted together*.

The Board dismissed Belden's argument that "helically twisting the twisted pairs along with the interior support, as opposed to separately twisting the components and intertwining them, produces a different structure." (A1-A26 at A17.) According to the Board, there was "no evidence before us that the structures resulting from these two processes differ." (A1-A26 at A17.) That analysis, however, improperly shifted the burden to Belden. *See, e.g., Rambus Inc.*, 731 F.3d at 1255 (holding the Board committed reversible legal error by "placing the burden on [the patent owner] that its claims were not obvious").

There is no dispute that the cables of Tessier '046 were created by pre-forming a helical separator and then laying the conductors into it. That being the case, the burden should have been on Berk-Tek to show that a cable built that way was a cable in which the core and the conductors were "twisted together about a common axis." Berk-Tek did not even attempt to prove that.

Moreover, being *twisted together* is a physical state required by the claims of the '575 Patent. Neither the Board nor Berk-Tek explains how the core and conductors of Tessier '046 meet that limitation and, at the IPR trial, Berk-Tek's counsel admitted that "[t]here could be" a structural difference in the cables of Tessier '046 and the '575 Patent. (A653-A654 at A654, 69:5-10.)

Neither Berk-Tek’s Petition, nor the Board’s Decision are supported by any testimony of a person of ordinary skill in the art, even though it was Berk-Tek’s burden to demonstrate unpatentability by a preponderance of the evidence. *See* 35 U.S.C. § 316(e) (stating “the petitioner [has] the burden of proving a proposition of unpatentability by a preponderance of the evidence”).

The Board’s conjecture that the two structures are identical does not constitute substantial evidence. *See, e.g., K/S HIMPP v. Hear-Wear Techs. LLC*, 751 F.3d 1362, 1366 (Fed. Cir. 2014) (explaining that “the Board cannot accept general conclusions about what is ‘basic knowledge’ or ‘common sense’ as a replacement for documentary evidence for core factual findings in a determination of patentability”) (citing *Zurko*, 258 F.3d at 1385-6); *In re Huai-Hung Kao*, 639 F.3d 1057, 1067 (Fed. Cir. 2011) (“The Board’s own conjecture does not supply the requisite substantial *evidence* to support the rejections”); *see also W.L. Gore & Assocs. v. Garlock, Inc.*, 721 F.2d 1540, 1554 (Fed. Cir. 1983) (“Anticipation of inventions set forth in product claims cannot be predicated on mere conjecture respecting the characteristics of products that might result from the practice of processes disclosed in references.”).

The Board also failed to address how a person of ordinary skill in the art (*e.g.*, Mr. Gareis) would regard, using the Board’s words, “*separately* twisting the

components,” as in Tessier ’046 (A1-A26 at A17), to be the same as “helically twisted *together*,” as in the ’061 Patent. *See, e.g., Ferguson Beauregard*, 350 F.3d at 1338 (“The words used in the claims must be considered in context and are examined through the viewing glass of a person skilled in the art.”); *Interactive Gift Express*, 256 F.3d at 1332 (“It is important to bear in mind that the viewing glass through which the claims are construed is that of a person skilled in the art.”).

Berk-Tek’s failure to cross-examine Mr. Gareis, or to provide competing evidence, means that his testimony about the meaning of claims and how Tessier ’046 would be understood by a person of ordinary skill in the art is unrebutted. *See, e.g., Monolithic Power Sys.*, 558 F.3d at 1350 (“O2 Micro did not cross-examine Dr. Horenstein on his assertion as to this point, and O2 Micro’s own expert did not testify on this subject at all. Thus, the record stands unrebutted with evidence showing that Henry included a flow-through switch.”).

Without the support of testimony of a person of ordinary skill in the art or other evidence, the Final Written Decision, which unjustifiably discounted and disregarded Mr. Gareis’ testimony, cannot be said to have been supported by substantial evidence. *See, e.g., K/S HIMPP*, 751 F.3d at 1366 (explaining that “the Board cannot accept general conclusions about what is ‘basic knowledge’ or ‘common sense’ as a replacement for documentary evidence for core factual

findings in a determination of patentability”) (citing *In re Zurko*, 258 F.3d 1362, 1385-6 (Fed. Cir. 2001)); *In re Huai-Hung Kao*, 639 F.3d 1057, 1067 (Fed. Cir. 2011) (“The Board’s own conjecture does not supply the requisite substantial *evidence* to support the rejections”).

Accordingly, for these further reasons, the Board’s anticipation ruling with respect to Ground 1 should be reversed.

C. AS TO GROUND 2, THE BOARD ERRED IN HOLDING THAT CLAIM 6 OF THE ’575 PATENT WAS OBVIOUS

Claim 6 of the ’061 Patent adds to claim 1 “wherein the communications cable is about 0.300 to 0.400 is diameter.” (A31-A40, ’061 Patent at 7:3-5.) The Board’s conclusion that this claim was unpatentable in view of Tessier ’046 and Meer ’417 was erroneous.

The *entirety* of Berk-Tek’s Petition argument concerning the combination of Tessier ’046 and Meer ’417 reads as follows: “Meer ’417 expressly discusses diameter issues with high frequency communication cables (page 1) and shows size ranges in the range of 0.27 to 0.43 inches (page 8).” (A76.) The Board’s Decision Instituting IPR provides no additional reasoning, stating only that “Meer ’417 conveys that diameters that are of suitable dimensions range from 0.27 to 0.43 inches.” (A428-A430 at A429.) The Final Written Decision simply adopted the Petition’s attorney argument. (A1-A26 at A22-A23.)

Unaddressed by the Petition or the Board's Decisions, however, is the fact that there *must* be "an apparent reason to combine the known elements in the fashion claimed by the patent at issue." *KSR Int'l Co. v. Teleflex*, 550 U.S. 398, 418 (2007). "The determination of patentability . . . requires a core factual finding, and as such, requires more than a conclusory statement from either [the patent challenger] or the Board." *K/S HIMPP*, 751 F.3d at 1365.

As Berk-Tek's Petition and the Board's Decisions made *no* effort to identify a reason to combine, and thus failed to establish even a *prima facie* case, the Board's obviousness holding cannot be said to have been supported by substantial evidence or sound legal reasoning.

Moreover, because the combination of Tessier '046 and Meer '417 was not properly presented in Berk-Tek's Petition, and was not elaborated on in the Board's Decision Instituting IPR, Belden was provided no meaningful opportunity to address it.²

² Because Meer '417 does not cure the deficiencies of Tessier '046 discussed in relation to Ground 1, the combination of Tessier '046 and Meer '417 cannot render dependent claim 6 invalid.

D. THE BOARD ERRED IN HOLDING THAT CLAIM 21 OF THE '575 PATENT IS OBVIOUS

Claim 21 adds to claim 7 “wherein the pair separator and the plurality of twisted pairs are cabled in an S-Z configuration.” (A31-A40, '061 Patent, at 8:46-48.)

The Board’s conclusion that claim 21 was obvious in view of Tessier '046 and JP '307 was erroneous because the Board failed to appreciate that the *preformed* core member of Tessier '046 would not be S-Z stranded, ignoring Mr. Gareis’ uncontroverted testimony.³

With regard to its embodiments with a “core member,” Tessier '046 explains that “[t]he projections 24 and the recesses 26 extend in helical fashion along the core member 20” and that “a spacer means in the form of a body 32 [is] formed by four helically extending spokes 34.” (A167-A180, Tessier '046, at 4:14-17, 25-31.) Mr. Gareis explained this disclosure as follows:

From these descriptions, it would be understood by a person of skill in the art that the core member 20 and body 32 are *pre-formed* with the projections 24 or spokes 34 already extending helically along the core member. (See Ex. 1003 at 4:14-17, 4:27-29.) In other words, *the core member/body of Tessier '046 was manufactured by helically extruding the core member/body, such that it has a helical geometry before it is wrapped in the jacket 12.*

³ In addition, JP '307 does not remedy the deficiencies of Tessier '046 identified with respect to Ground 1.

(*See, e.g.*, A167-A180, Tessier '046, at A178-A179; A494-A510, ¶ 32.)

Mr. Gareis' testimony regarding the correct understanding of Tessier '046's pre-formed helical core is un rebutted, and, even though Berk-Tek had the burden of proving unpatentability, it did not even cross-examine Mr. Gareis.

Regarding the combination of Tessier '046 and JP '307, Mr. Gareis explained that "a person of ordinary skill in the art would recognize that the 'core member' of Tessier '046 with its pre-formed structure would not be S-Z stranded together with the twisted conductor pairs, due to [the] difficulty of aligning the twisted conductor pairs with the grooves of Tessier '046's pre-formed 'core member' during the high-speed manufacturing operation." (A494-A510, ¶ 42; A463-A485 at A483.)

The Final Written Decision does not address the pre-formed structure of Tessier '046's core member, stating instead that Belden's arguments rise and fall solely on its Ground 1 arguments. (A1-A26 at A24-A25.) The Board was incorrect—as indicated above, Belden's arguments and evidence (including Mr. Gareis' testimony) addressing Ground 3 were not limited to the arguments made in response to Ground 1.

Given that Tessier '046's core was *pre-formed* in a helix, the Board's Ground 3 holding could only have been based on a misapprehension of Tessier

'046's teachings and cannot be said to be based on substantial evidence (or sound legal reasoning). *See, e.g., Institute Pasteur v. Focarino*, 738 F.3d 1337, 1345 (Fed. Cir. 2013) (concluding that the Board's decision was not based on substantial evidence where "[t]he Board relied on its misreading of both references, and nothing more"); *see also In re Huai-Hung Kao*, 639 F.3d 1057, 1067 (Fed. Cir. 2011) ("The Board's own conjecture does not supply the requisite substantial *evidence* to support the rejections").

For this further reason, the Board's obviousness ruling with respect to Ground 3, regarding obviousness of claim 21, should be reversed.

VIII. CONCLUSION AND STATEMENT OF RELIEF SOUGHT

Because the Board's holding in the IPR is both legally and factually incorrect, Belden respectfully requests that this Court reverse the Board's Final Written Decision.

Dated: October 3, 2014

Respectfully submitted,

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ADDENDUM

Trials@uspto.gov
571-272-7822

Paper 24
Entered: April 28, 2014

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

BERK-TEK LLC
Petitioner

v.

BELDEN TECHNOLOGIES INC.
The Patent Owner

Case IPR2013-00069
Patent 7,663,061 B2

Before JAMESON LEE, JOSIAH C. COCKS, and
PHILLIP J. KAUFFMAN, *Administrative Patent Judges*.

KAUFFMAN, *Administrative Patent Judge*.

FINAL WRITTEN DECISION
35 U.S.C. § 318(a) and 37 C.F.R. § 42.73

Case IPR2013-00069
Patent 7,663,061

I. BACKGROUND

A. *Introduction*

On December 3, 2012, Petitioner, Berk-Tek, LLC, filed a petition for *inter partes* review of claims 1-21 of U.S. Patent No. 7,663,061 B2 (“the ’061 patent”).¹ Paper 1 (“Pet.”). On May 23, 2013, the Board instituted a trial for each of claims 1-21, on one or more grounds of unpatentability. Paper 11 (“Dec.”).

After institution of trial, the Patent Owner filed a patent owner response (Paper 16, “PO Resp.”), but did not file a motion to amend claims. Petitioner subsequently filed a reply. Paper 17 (“Pet. Reply”).

A consolidated oral hearing resulting in a single transcript was held on January 8, 2014, for this case and for *inter partes* review 2013-00058, a related case involving the same parties.²

We have jurisdiction under 35 U.S.C. § 6(c). This final written decision is issued pursuant to 35 U.S.C. § 318(a).

Claims 1-21 of the ’061 Patent are *unpatentable*.

B. *Standard for Decision with Respect to Patentability*

When, as here, an *inter partes* review is instituted and not dismissed, the Board shall issue a final written decision with respect to the patentability

¹ In the Petition, Petitioner is identified as “Nexans, Inc.” Paper 1. On April 18, 2013, Nexans informed the Board that Nexans’s successor in interest is “Berk-Tek, LLC.” Paper 10.

² A transcript of the final hearing is included in the record as Paper 23 (“Tr.”).

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of any patent claim challenged by the petitioner. 35 U.S.C. § 318(a). The standard for determining patentability is set forth in 35 U.S.C. § 316(e), which provides as follows:

(e) Evidentiary standards - In an inter partes review instituted under this chapter, the petitioner shall have the burden of proving a proposition of unpatentability by a preponderance of the evidence.

C. The '061 Patent

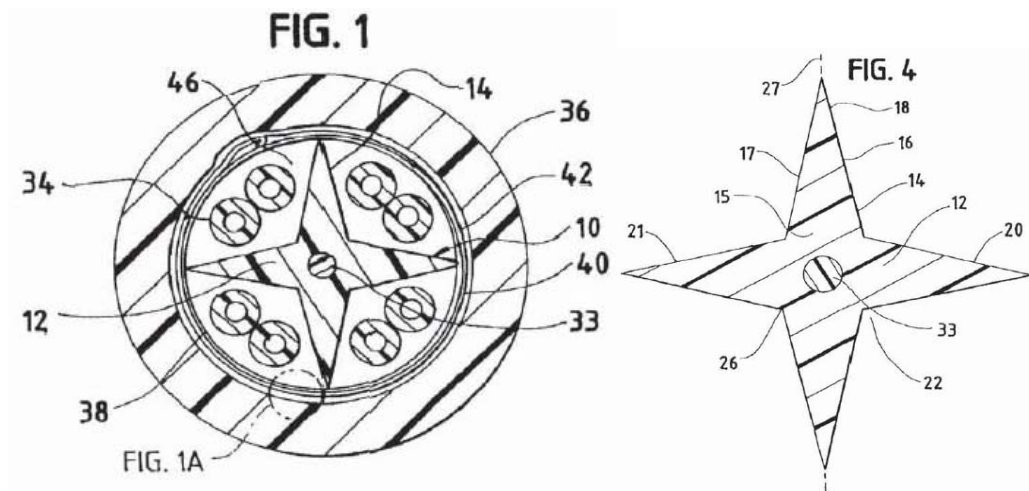
The '061 Patent discloses a high performance data cable. Ex. 1001, 1:12. As background, the '061 Patent discloses that many data communications systems utilize high performance data cables having at least four twisted pairs (a pair of conductors twisted about each other). *Id.* at 1:18-19. These cables must meet exacting specifications with regard to data speed and electrical characteristics. *Id.* at 1:25-27.

The cable of the '061 Patent includes a separator³ having grooves that accommodate twisted pair conductors allowing for easy spacing of the twisted pairs that improves near-end cross-talk (NEXT) and lessens the need for complex and hard to control lay procedures and individual shielding. *Id.* at 1:28-29, 55-57, 60-63.

³ Also known as an “interior support” and a “star separator.” *See, e.g.*, Ex. 1001, 1:13-14; 6:46.

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Figures 1 and 4 of the '061 Patent are reproduced below:



Figures 1 and 4 are vertical cross-sectional views of the cable and the interior support, respectively.

In this embodiment, interior support 10 includes central region 12 with four prongs or splines 14 that extend both along the longitudinal length of interior support 10 and radially outward from the central region of interior support 10. *Id.* at 3:57-58, 4:1-3, 13-24; figs. 1, 4. Insulated twisted pairs of conductors 34 are disposed within grooves 22 defined by each pair of adjacent prongs 14, and run the longitudinal length of interior support 10. *Id.* at 5:10-12; fig. 1.

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D. Illustrative Claims

Of the challenged claims 1, 7, 12, and 19 are independent. Claim 1 is illustrative, and is reproduced below:

1. A communications cable comprising:
 - a plurality of twisted pairs that carry communications signals;
 - a pair separator disposed among the plurality of twisted pairs,
 - the pair separator comprising a central body portion and a plurality of arms radially extending from the central body portion, each pair of adjacent arms defining a channel; and
 - a cable covering surrounding the plurality of twisted pairs and the pair separator along the length of the cable;
 - wherein at least one twisted pair of the plurality of twisted pairs is respectively located in the channel defined by each pair of adjacent arms;
 - wherein the plurality of twisted pairs and the pair separator are helically twisted together along the length of the cable; and
 - wherein the cable covering does not include an electrically conductive shield.

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E. Prior Art References Supporting Alleged Unpatentability of Claims 1-21

JP '307	Sh056 (1981)-7307	Jan. 26, 1981	Ex. 1005 ⁴
Tessier '046	CA 2,058,046	Aug. 22, 1992	Ex. 1003
Meer '417 ⁵	CA 2,071,417	Dec. 18, 1993	Ex. 1006

F. Pending Grounds of Unpatentability Against Claims 1-21⁶

Reference(s)	Grounds	Claims
Tessier '046	§ 102	1-5 and 7-20
Tessier '046 and Meer '417	§ 103	6
Tessier '046 and JP '307	§ 103	21

II. CLAIM INTERPRETATION

In an *inter partes* review, claim terms in an unexpired patent are interpreted according to their broadest reasonable construction in light of the specification of the patent in which they appear. 37 C.F.R. § 42.100(b). Claim terms are also given their ordinary and customary meaning as would be understood by one of ordinary skill in the art in the context of the entire disclosure. *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1257 (Fed. Cir. 2007). If an inventor acts as his or her own lexicographer, the definition must be set forth in the specification with reasonable clarity, deliberateness, and precision. *Renishaw PLC v. Marposs Societa' per Azioni*, 158 F.3d 1243, 1249 (Fed. Cir. 1998).

⁴ Exhibit 1005 contains both the Japanese and English language versions of the reference.

⁵ The named inventor is Harry van der Meer.

⁶ See Dec. 16-17.

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The challenge is to interpret claims in view of the specification without unnecessarily importing limitations from the specification into the claims. *See E-Pass Techs., Inc. v. 3Com Corp.*, 343 F.3d 1364, 1369 (Fed. Cir. 2003). If a feature is not necessary to interpret what the inventor means by a claim term, it is “extraneous” and should not be read into the claim. *Renishaw PLC*, 158 F.3d at 1249; *E.I. du Pont de Nemours & Co. v. Phillips Petroleum Co.*, 849 F.2d 1430, 1433 (Fed. Cir. 1988). The construction that stays true to the claim language and most naturally aligns with the inventor’s description is likely the correct interpretation. *See Renishaw PLC*, 158 F.3d at 1250.

A. *Channels*

1. *Board Interpretation*

We begin our claim construction analysis with the claims. *See Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005) (“It is a bedrock principle of patent law that the claims of a patent define the invention to which the patentee is entitled the right to exclude.” (citations and quotations omitted)). Independent claim 1 is directed to a communications cable that includes a plurality of twisted pairs, a pair separator, and a cable covering. The pair separator includes a plurality of arms, each pair of adjacent arms defining a channel. At least one twisted pair of the plurality of twisted pairs is located in the channel.

The Specification of the ’061 Patent does not provide a lexicographical definition of “channel.” Indeed, the term “channel” is used

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in the claims, but is not used in the remainder of the Specification. An ordinary meaning of “channel” is “a long gutter, groove, or furrow.” Ex. 2001; Ex. 2002. Nothing in the Specification of the ’061 Patent is inconsistent with the ordinary meaning that a channel is a “long gutter, groove, or furrow.”

The ’061 Patent is a continuation of application No. 09/765,914, now U.S. Patent No. 7,339,116 (“the ’116 Patent”), which is a continuation-in-part of application No. 08/629,509, now U.S. Patent No. 5,789,711 (the ’711 Patent”) and application No. 09/074,272, now U.S. Patent No. 6,222,130 (“the ’130 Patent”). Ex. 1001, 1:3-8.

Because the ’061 Patent derives from the same parent application and shares common terms with the ’116 Patent, we construe claim terms in the ’061 Patent consistent with their use in the ’116 Patent.⁷ *See NTP v. Research in Motion, Ltd.*, 418 F. 3d 1282, 1292 (Fed. Cir. 2005) (When construing claim in patents that derive from the same parent application and share common terms, “we must interpret the claims consistently across all asserted patents.”).

In the ’116 Patent, independent claim 1 is directed to a data cable that includes an interior support having a plurality of projections where adjacent projections define an “open space,” and one of the plurality of twisted pairs is disposed in each open space. Ex. 3001, 6:45-61. Claim 3 of the ’116 Patent depends from independent claim 1 and requires that the open space be

⁷ The term “channels” is not used in the ’711 Patent or the ’130 Patent.

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one selected from “a group consisting of a channel, a groove, a duct, and a passage.” *Id.* at 6:65-67. Independent claim 4 and its dependent claim 6 utilize the claim terms “open space” and “channel” in the same manner. *Id.* at 7:1-15; 8:1-17. The term “channel” is not otherwise used in the ’116 Patent.

Independent claims 7 and 12 of the ’061 Patent contain uses of the term “channel(s)” similar to that of independent claim 1.⁸

Therefore, in the specific context of these claims, consistent with the ’116 and ’061 Patents, a channel, as a long gutter, groove, or furrow is a type of open space defined by the interior support within which one of the plurality of twisted pairs is disposed.

2. The Patent Owner Argument

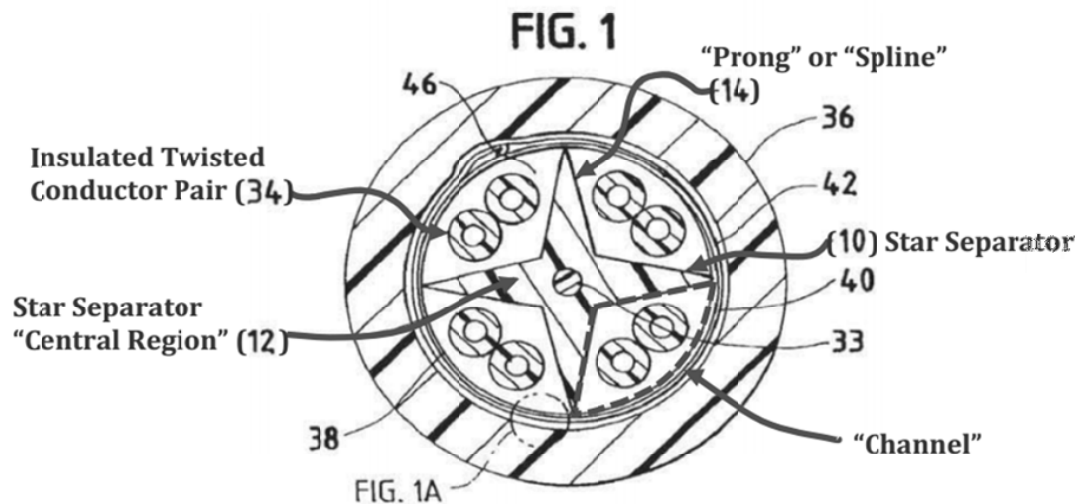
The Patent Owner argues that “channels” as claimed are substantially enclosed passages formed in the cable by the interior support and the jacket. Ex. 2004, 4; *see also* PO Resp. 10-12.

⁸ Independent claim 19 does not recite “channels.” Rather, the adjacent arms of the interior support define “grooves.” Ex. 1001, 8:22-43.

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An annotated version of Figure 1 of the '061 Patent is reproduced below:

The '061 Patent



This annotated version of Figure 1 of the '061 Patent is a cross-sectional view of a cable.

The Patent Owner annotated Figure 1 with a dotted line identified as a "channel." The Patent Owner asserts that the ordinary meaning of the term "channels" viewed in light of the Specification supports the interpretation that "channels" are substantially enclosed passages formed in the cable by the interior support and the jacket. PO Resp. 9-11.

a) Ordinary Meaning

The Patent Owner proffers that ordinarily "channel" is understood to mean either "a usually tubular enclosed passage: CONDUIT," or "an especially tubular enclosed passage: CONDUIT, PIPE, DUCT (the poison ~

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in a snake's fangs." PO Resp. 10. Based upon these ordinary meanings, the Patent Owner argues that "channels" as claimed are substantially enclosed passages formed in the cable by the interior support and the jacket. Ex. 2004, 4; *see also* PO Resp. 10-12.

This contention contradicts the plain language of each of the independent claims. As explained above, each of the independent claims calls for the separator to define the channels, not the separator support in combination with the jacket. *See Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005) (en banc) (the claims define the invention).

The Patent Owner's claim construction is also flawed in that the ordinary meaning of "channel" proffered is a tubular enclosed passage, yet the Patent Owner asks that "channel" be interpreted as a *substantially* enclosed passage. As pointed out by Petitioner, nothing in the '061 Patent requires the channels to be "substantially enclosed." *See* PO Resp. 1. As detailed below, the Patent Owner does not explain cogently how such a deviation from the ordinary meaning of the term "channel" is warranted by the Specification. *See e.g., In re Translogic Tech., Inc.*, 504 F.3d at 1257 (absent a lexicographical definition, claim terms should be given their ordinary meaning as understood by a person of ordinary skill in the art).

b) Specification

The Patent Owner's claim interpretation looks to three portions of the Specification for support. First, the Patent Owner observes that the Specification indicates that each pair of adjacent prongs 14 of interior support 10 defines a groove 22. PO Resp. 11 (citing Ex. 1001, 4:42).

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Indeed, the '061 Patent contains such disclosure. *See* Ex. 1001, 4:21; fig. 2. This disclosure does not describe the groove as a substantially enclosed passage formed by the interior support and the jacket. Further, the Patent Owner fails to explain persuasively how this disclosure regarding a groove relates to the scope of the term “channel.”

Second, the Patent Owner asserts that in the '061 Patent the term “channels” is reserved for describing each substantially enclosed space that is formed when the jacket is closed around the arms to enclose the twisted pairs. PO Resp. 11. In support of this assertion, the Gareis Declaration states, “when the '061 patent describes the space between its prongs or splines, it uses the term ‘groove,’ and that the term ‘channel’ is reserved for contexts in which the area between the prongs/splines is also enclosed by the jacket, forming a substantially enclosed passage.” Ex. 2003 ¶ 25.

This assertion is incorrect in terms of the structure that defines the channel and in terms of the extent of the channel. Regarding structure, the '061 Patent does not describes a “channel” as a space defined by the interior support in combination with the jacket. Rather, as detailed above, the '061 Patent consistently indicates that the interior support defines the channels. Regarding the extent of the channel, the '061 Patent does not describe “channels” as substantially enclosed passages.

Third, the Patent Owner contends that the contrast of the term “channels” as used in claims 1, 7, and 12 to use of the term “grooves” in claim 19 illustrates that the terms have different meanings and, therefore, interpreting “channels” and “grooves” as interchangeable is an erroneous

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claim construction. PO Resp. 11-12. As explained above, a channel and a groove are each a type of open space defined by the interior support. The Patent Owner does not distinguish persuasively a channel from a groove in a manner that supports the Patent Owner's claim interpretation that a channel is a substantially enclosed passage.

c) Declaration

As mentioned above, the Patent Owner offers the declaration of Mr. Gareis, a co-inventor of the '061 Patent, stating that a person of ordinary skill in the art of designing twisted pair cables would have understood the term "channel" to mean a substantially enclosed passage in the cable. Ex. 2003 ¶ 25. Beyond the erroneous factual assertion regarding the use of the term "channel" in the '061 Patent explained above, the Declaration suffers from other shortcomings.

For the reasons that follow, this contention is unpersuasive. First, we note that the statement does not go so far as to assert that "channel" is a term of art; rather, the assertion relates to the meaning of "channel" in light of the Specification. Second, as detailed above, the intrinsic evidence as to the meaning of the claim term "channel" is unambiguous so that we need not resort to expert testimony. *See* Ex. 2003 ¶ 11; *Bell & Howell Document Mgmt. Prods. Co. v. Altek Sys.*, 132 F.3d 701, 705 (Fed. Cir. 1997); *see also Roton Barrier, Inc. v. Stanley Works*, 79 F.3d 1112, 1126 (Fed. Cir. 1996). Third, the statement is conclusory in that it is not supported by a citation to the Specification or an ordinary meaning. *See* 37 C.F.R. § 42.65(a); *see also Rohm and Haas Co. v. Brotech Corp.*, 127 F.3d 1089, 1092 (Fed. Cir. 1997).

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For these reasons, the claim construction put forth in the Declaration is unpersuasive.

d) In the Cable

At the hearing, the Patent Owner elaborated that “channels” as claimed are substantially enclosed passages because the claim recites that the “channels” are “in the data communications cable.” Tr. at 31. This argument is not relevant because the quoted language is not contained in the claims at issue.

e) Conclusion

For these reasons, we decline to accept the Patent Owner’s claim construction.

B. Helically Twisted Together

1. Board Interpretation

a) Claim Language

Independent claims 1, 12, and 19 are each apparatus claims directed to a communications cable. Each claim recites, “wherein the plurality of twisted pairs and the interior support are helically twisted together along the length of the cable.” Ex. 1001, 6:55-57; 8:1-3, 38-40. While the clause at issue begins with the term “wherein,” it does not merely state the result of limitations elsewhere recited in the claim. Only this clause recites that the twisted pair conductors and the interior support are twisted together about a common axis. Therefore, this clause adds to the patentability or substance

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of the claim. *Cf. Texas Instruments, Inc. v. U.S. Int'l Trade Comm'n*, 988 F2d 1165, 1172 (Fed. Cir. 1993).

The claims do not recite that the claimed structure is the structure produced by twisting the twisted pairs along with the interior support. Nor do the claims recite that the cable is “closed” or “cabled.”

b) Specification

The Specification of the '061 Patent does not include a lexicographical definition of the claim phrase “helically twisted together,” or any of the terms in that phrase. Nor does the '061 Patent describe the process of helically twisting together the twisted pair conductors and the interior support.

The '061 Patent describes that the separator may be “cabled” with a helixed or S-Z configuration to define helically twisted grooves that accommodate the twisted pairs. Ex. 1001, 5:18-23. Thus, the separator alone is “cabled,” and being “cabled” is not described as twisting the twisted pairs along with the separator. More importantly, the claims do not require that the separator is “cabled;” rather, as noted above, the claims require that the twisted pairs and the interior support are helically twisted together along the length of the cable.

c) Interpretation

The structure required by the claims is the twisted pairs and the interior support helically twisted together along the length of the cable. The claims are not limited to a structure produced by a certain method of manufacture.

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2. Patent Owner Argument

The Patent Owner does not provide an explicit claim construction. Rather, the Patent Owner implies a claim construction through reference to the prior art. Specifically, the Patent Owner argues that Tessier '046's core member 22 and body 32 are pre-formed as helixes as opposed to being helically twisted together with the twisted conductor pairs, and for that reason, Tessier '046 cannot anticipate claims 1, 12, and 19. PO Resp. 14-15. In support of this contention, the Gareis Declaration states that the "cabling" process of the '061 Patent calls for forming the cable by helically twisting the conductor pairs along with the separator about a common axis. Ex. 2003 ¶¶ 30-33.

To the extent that the Patent Owner's argument can be seen as a contention that the step of twisting the twisted pairs along with the separator is claimed, such a contention is unpersuasive because the claims at issue are apparatus claims. *See* Pet. Reply 13 (noting that the claims at issue are product claims and do not cover a process).

The statement in the Gareis Declaration that as a result of the "cabling" process, the separator/interior support is twisted along with the twisted pairs about a common axis, is contradicted by the reference itself. *See* Ex. 2003 ¶ 33. As detailed above, the '061 Patent does not describe "cabling" as twisting the twisted pairs along with the separator; rather, the '061 Patent describes that being "cabled" defines grooves in the separator. Significantly, as detailed above, claims 1, 12, and 19 do not require cabling or closing the cable. Instead, claims 1, 12, and 19 each require the twisted

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pairs and the separator to be helically twisted together along the length of the cable. For that reason, the meaning of “cabled” is not determinative of our claim construction.

The Patent Owner’s argument also can be seen as an assertion that helically twisting the twisted pairs along with the interior support, as opposed to separately twisting the components and intertwining them, produces a different structure. We have no evidence before us that the structures resulting from these two processes differ. However, we need not make such a determination because nothing in the claim language or the Specification limits the claims to the structure produced by a specified process. As explained above, the claims require that the twisted pairs and the interior support are helically twisted together along the length of the cable, and the claims are not limited to a structure produced by a certain method of manufacture. That is, the structure required by the claims could be produced by either method of manufacture.

3. Conclusion

The structure required by the claims is the twisted pairs and the interior support helically twisted together along the length of the cable, and the claims are not limited to a structure produced by a certain method of manufacture.

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III. PATENTABILITY

A. *Alleged Anticipation by Tessier '046*

Petitioner contends that claims 1-5 and 7-20 are unpatentable over Tessier '046. Petitioner provides detailed explanations as to how each claim element, arranged as is recited in these claims, is disclosed by Tessier '046. Pet. 15-16, 25-28; Pet. Reply 1-15. Upon review of the Petition, Patent Owner's Response and Petitioner's Reply, we determine that Petitioner has shown by a preponderance of the evidence that claims 1-5 and 7-20 are unpatentable under 35 U.S.C. § 102 as anticipated by Tessier '046.

To anticipate a patent claim under 35 U.S.C. § 102, "a single prior art reference must expressly or inherently disclose each claim limitation." *Finisar Corp. v. DirecTV Group, Inc.*, 523 F.3d 1323, 1334 (Fed. Cir. 2008). "It is axiomatic that anticipation of a claim under § 102 can be found only if the prior art reference discloses every element of the claim." *In re King*, 801 F.2d 1324, 1326 (Fed. Cir. 1986).

1. *Tessier '046*

Tessier '046 discloses an electrical telecommunications cable. Ex. 1003, 1:2-3. The cable comprises: a plurality of twisted pairs of individually insulated conductors, a spacer means, and an outer jacket. Ex. 1003 at 2:1-5; 2:11-20; 3:2-6. The spacer means extends along the axis of the cable and has radially outwardly extending projections that are spaced apart circumferentially and define recess regions in which the conductors are disposed. *Id.*

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Figures 2 and 3 of Tessier '046, are reproduced below:

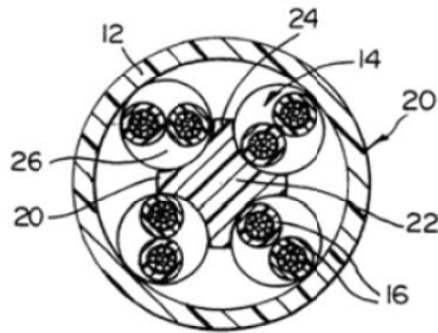


FIG. 2

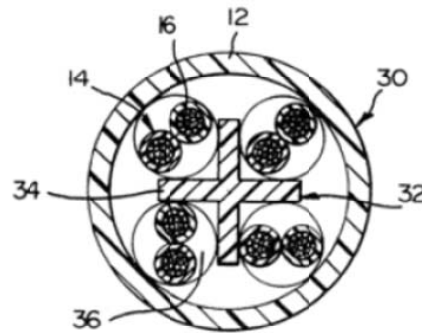


FIG. 3

Figures 2 and 3 illustrate the second and third embodiments of Tessier '046, respectively.

In the second embodiment, cable 20 is comprised of jacket 12 surrounding four pairs 14 of insulated conductors 16 and central core member 20 (both the cable and the central core member are labeled “20” in figure 2). Ex. 1003, 2:36-3:1; 3:36-4:4. The central core member “extends axially along the cable and is formed from a tensile dielectric material.” *Id.* at 4:4-5. The central core member includes central mass 22 and four projections 24, with concave sides, that are equally angularly placed around the axis of the central core member and define recesses 26 between them; an individual twisted pair of the conductors lies in each of the four recesses between the projections. *Id.* at 4:5-14. “The projections 24 and thus the recesses 26 extend in helical fashion along the core member 20 to allow the

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pairs 14 to lie within the recesses in stranded fashion.” *Id.* at 4:14-17 (emphasis added).

The third embodiment is similar to the second embodiment except that central core member 20 of the second embodiment is replaced by in the third embodiment by body 32 formed by four helically extending spokes 34 that lie at right angles to each other in cross-section-shaped (“cruciform fashion”). Spokes 34 of the body 32 form recess regions 36 that accommodate the pairs 14 of conductors 16. *Id.* at 4:22-37.

In both the second and third embodiments, jacket 12 holds pairs 14 of conductors 16 in their respective recesses (26, 36). *Id.* at 2:4-5; 4:14-17, 35-37; figs. 2, 3.

We have reviewed the parties’ arguments and supporting evidence, and determine that the explanations and supporting evidence provided by Petitioner as to how each element of the challenged claims is described by Tessier ’046 have merit. Our analysis will focus on the deficiencies alleged by the Patent Owner.

2. “Channels” (Claims 1, 7, and 12)

The Patent Owner argues that Tessier ’046 discloses one large cylindrical channel with core member 20 being located in the center.⁹ PO Resp. 12-13; Ex. 2003 ¶¶ 27-28.

This contention is premised on the interpretation that “channels” as claimed are substantially enclosed passages formed by the separator and the

⁹ Patent Owner does not present additional arguments for the associated dependent claims.

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jacket. As explained above, this interpretation is incorrect. Consequently, the Patent Owner's argument is unpersuasive because it is not commensurate in scope with the claims at issue. *See In re Self*, 671 F.2d 1344, 1348 (CCPA 1982) (“[A]ppellant’s arguments fail from the outset because . . . they are not based on limitations appearing in the claims.”).

Tessier '046 discloses a second (cable 20) and third embodiment (cable 30), each including an interior support (central mass 22, body 32) having radially outwardly extending projections 24 or spokes 34 that define channels (recess regions 26, 34). Ex. 1003, 2:36-3:35; figs. 2, 3; Pet. 15-16, 24-28. These channels (recess regions 26, 34) permit twisted pairs 14 of conductors 16 to be individually disposed within them. Ex. 1003, 4:35-37. Further, these channels (recess regions 26, 34), in combination with the jacket 12, maintain the twisted pairs 14 of conductors 16 in their respective channels. *Id.* at 4:14-17; figs. 2, 3.

For these reasons, the Patent Owner's arguments are unpersuasive with regard to independent claims 1, 7, and 12 and their respective dependent claims 2-5, 8-11, and 13-18.

3. “*Twisted together*” (*Claims 1, 12, and 19*)

The Patent Owner argues that independent claims 1, 12, and 19 cannot be anticipated by Tessier '046 because core member 22 and body 32 are preformed as helixes rather than being helically twisted together with the conductor pairs.¹⁰ PO Resp. 14-16.

¹⁰ Patent Owner does not present additional arguments for the associated

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This argument is premised on the interpretation that the claims are limited to a structure produced by twisting the twisted pairs along with the separator and do not cover a structure produced by separately twisting those components and then intertwining them. As explained above, the claims at issue are not limited in this manner. Thus, the Patent Owner's argument is unpersuasive because it is not commensurate in scope with the claims at issue. *See In re Self*, 671 F.2d at 1348.

Upon review of the Petition, Patent Owner's response and Petitioner's reply, we determine that Petitioner has shown by a preponderance of the evidence that Tessier '046 anticipates claims 1-5 and 7-20.

B. Alleged Obviousness over Tessier '046 and Meer '417

Claim 6 depends from claim 1, and recites, "wherein the communications cable is about 0.300 to 0.400 is [sic] diameter."¹¹

As noted in section I.F. above, Petitioner contends that claim 6 is unpatentable as obvious over Tessier '046 and Meer '417. Petitioner provides sufficient explanations and evidence to demonstrate by a preponderance of the evidence that the combination of Tessier '046 and Meer '417 would have rendered the claimed subject matter obvious to one with ordinary skill in the art. Pet. 15-16, 19, 34; Pet. Reply 1-8, 10-15.

dependent claims.

¹¹ *See also* Dec. 12-13 (explaining that the dimensions of claim 6 are in inches).

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1. Meer '417

Meer discloses a telecommunications cable having a diameter between about 0.27 inches and about 0.43 inches. Pet. 19, 34; Ex. 1006, 1:2-3, 8; Table II. Meer discloses the desirability of minimizing the outside diameter of communications cables. Ex. 1006, 1:4-3:3.

2. Analysis

We have reviewed the parties' arguments and supporting evidence.

As discussed above, Meer discloses a cabling having a diameter overlapping the claimed range, and the desirability of minimizing communications cable outside diameter.

Our analysis will focus on the deficiencies alleged by the Patent Owner.

The Patent Owner argues that Meer does not cure the deficiencies of Tessier identified in the argument against the first ground of unpatentability. PO Resp. 16. Therefore, the Patent Owner is applying the arguments against claim 6 by virtue of its dependence from independent claim 1. These arguments are unpersuasive for the reasons given in the analysis of independent claim 1 in the first ground of unpatentability above.

Upon review of the Petition, Patent Owner's response, and Petitioner's reply, we determine that Petitioner has shown by a preponderance of the evidence that claim 6 is unpatentable as obvious over Tessier '046 and Meer '417.

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C. Alleged Obviousness over Tessier '046 and JP '307

As noted in section I.F. above, Petitioner contends that claim 21 is unpatentable as obvious over Tessier '046 and JP '307. Petitioner provides sufficient explanations and evidence to demonstrate by a preponderance of the evidence that claim 21 is unpatentable as obvious over Tessier '046 and JP '307. Pet. 15-16, 28-29, 34; Pet. Reply 1-8, 10-15.

1. JP '307

JP '307 discloses a device for overall manufacture of insulation clad communications cables, and specifically discloses S-Z stranding of cable components. Pet. 18-19, 29; JP '307, p. 24.

2. Analysis

Having reviewed the parties' arguments and supporting evidence, we determine that Petitioner's explanations and supporting evidence demonstrate by a preponderance of the evidence that the challenged claims are unpatentable as obvious over Tessier '046 and JP '307. Our analysis will focus on the deficiencies alleged by the Patent Owner.

The Patent Owner argues that JP '307 does not cure the deficiencies of Tessier identified in the argument against the first ground of unpatentability. PO Reply 17. Therefore, The Patent Owner is applying the arguments against claim 21 by virtue of its dependence from independent claim 19. These arguments are unpersuasive for the reasons given in the analysis of independent claim 19 in the first ground of unpatentability above.

Upon review of the Petition, Patent Owner's response, and Petitioner's reply, we determine that Petitioner has shown by a

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preponderance of the evidence that claim 21 is unpatentable as obvious over Tessier '046 and JP '307.

IV. CONCLUSION

Berk-Tek has met its burden of proof by a preponderance of the evidence in showing under 35 U.S.C. § 103 that: (1) claims 1-5 and 7-20 are unpatentable as anticipated by Tessier '046; (2) claim 6 is unpatentable as obvious over Tessier '046 and Meer '417; and (3) claim 21 is unpatentable as obvious over Tessier '046 and JP '307.

V. ORDER

In consideration of the foregoing, it is

ORDERED that claims 1-21 of the U.S. Patent 7,663,061 Patent are unpatentable; and

FURTHER ORDERED that because this is a final written decision, parties to the proceeding seeking judicial review of the decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

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Paper No. 25
Entered: June 5, 2014

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

BERK-TEK LLC
Petitioner

v.

BELDEN TECHNOLOGIES INC.
Patent Owner

Case IPR2013-00069
Patent 7,663,061

Before PATRICK E. BAKER, *Trial Paralegal*.

ERRATA

The April 28, 2014, Final Written Decision (hereinafter “Decision”) is revised as follows to correct the following typographical error:

On page 26 of the Decision, under the heading of “For PETITIONER,” attorneys for the Petitioner Messrs. James Blank and David Soofian were incorrectly named as members of the law firm Sofer & Haroun L.L.P. In addition, under the same heading, the email address for Mr.

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Robert Haroun was inadvertently omitted. Therefore, the attorney listing under the “For PETITIONER” heading at page 26 of the Decision is withdrawn and replaced with the following new listing:

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All other portions of the Decision remain unchanged. Any confusion caused by the above-noted error is regrettable.

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US007663061B2

(12) **United States Patent**
Gareis et al.

(10) **Patent No.:** **US 7,663,061 B2**
(45) **Date of Patent:** ***Feb. 16, 2010**

(54) **HIGH PERFORMANCE DATA CABLE**

(75) Inventors: **Galen Mark Gareis**, Richmond, IN
(US); **Paul Z. Vanderlaan**, Oxford, OH
(US)

(73) Assignee: **Belden Technologies, Inc.**, St. Louis,
MO (US)

(*) Notice: Subject to any disclaimer, the term of this
patent is extended or adjusted under 35
U.S.C. 154(b) by 0 days.

This patent is subject to a terminal dis-
claimer.

(21) Appl. No.: **11/877,343**

(22) Filed: **Oct. 23, 2007**

(65) **Prior Publication Data**

US 2008/0041609 A1 Feb. 21, 2008

Related U.S. Application Data

(63) Continuation of application No. 09/765,914, filed on
Jan. 18, 2001, now Pat. No. 7,339,116, which is a
continuation-in-part of application No. 09/074,272,
filed on May 7, 1998, now Pat. No. 6,222,130, and a
continuation-in-part of application No. 08/629,509,
filed on Apr. 9, 1996, now Pat. No. 5,789,711.

(51) **Int. Cl.**
H01B 11/02 (2006.01)

(52) **U.S. Cl.** **174/110 R; 174/113 R;**
174/113 C; 174/113 AS

(58) **Field of Classification Search** **174/110 R,**
174/113 C, 113 R, 120 R, 131 AS, 131 A
See application file for complete search history.

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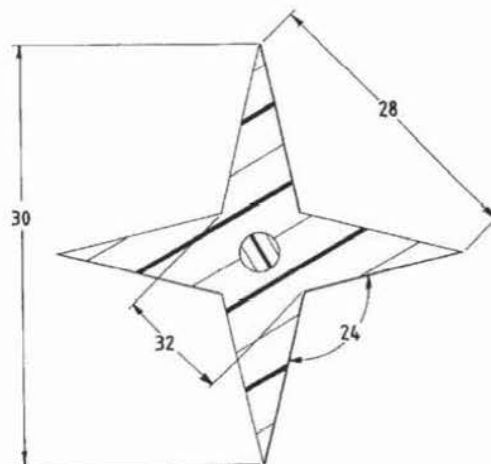
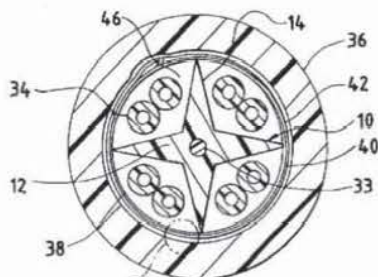
Primary Examiner—William H Mayo, III

(74) *Attorney, Agent, or Firm*—Lando & Anastasi, LLP

(57) **ABSTRACT**

The present invention is for a high performance data cable which has an interior support or star separator. The star separator or interior support extends along the longitudinal length of the data cable. The star separator or interior support has a central region. A plurality of prongs or splines extend outward from the central region along the length of the central region. Each prong or spline is adjacent with at least two other prongs or splines. The prongs or splines may be helixed or S-Z shaped as they extend along the length of the star separator or interior support. Each pair of adjacent prongs or splines defines grooves which extend along the longitudinal length of the interior support. At least two of the grooves have disposed therein an insulated conductor. The interior support can have a first material and a different second material. The different second material forms an outer surface of the interior support.

21 Claims, 3 Drawing Sheets



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FIG. 1

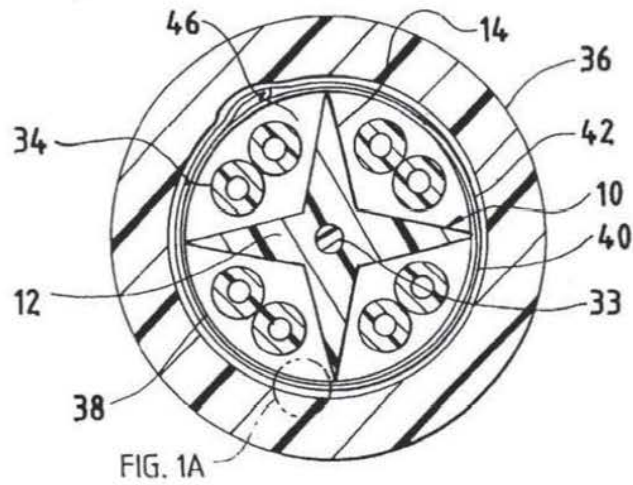


FIG. 1A

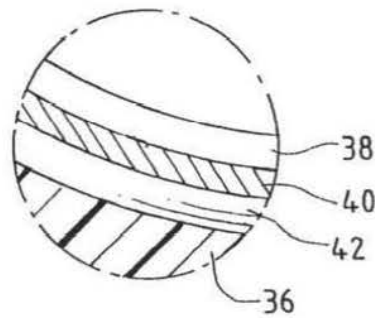
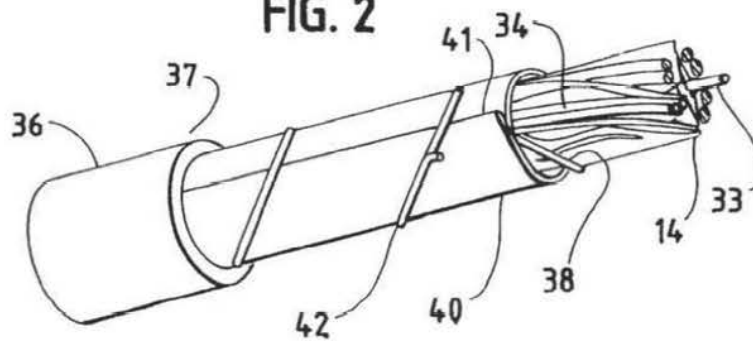


FIG. 2



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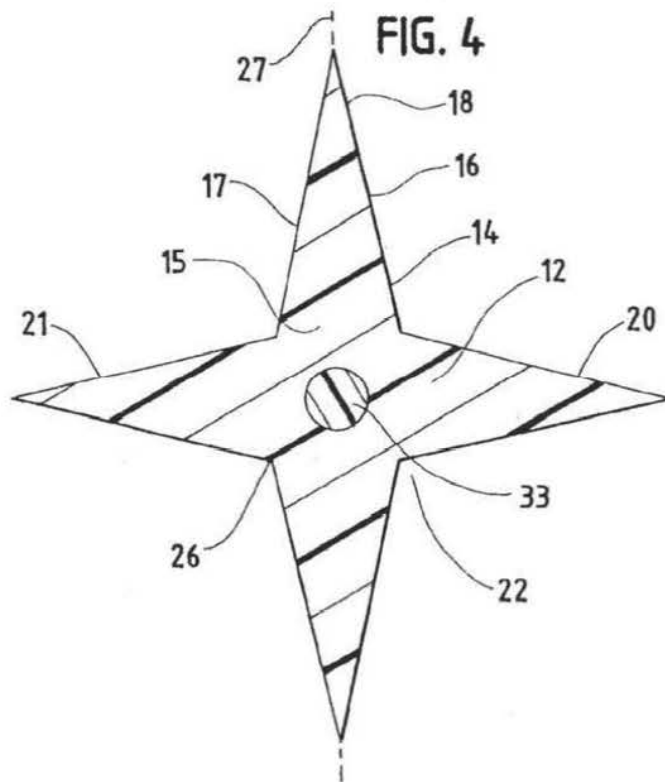
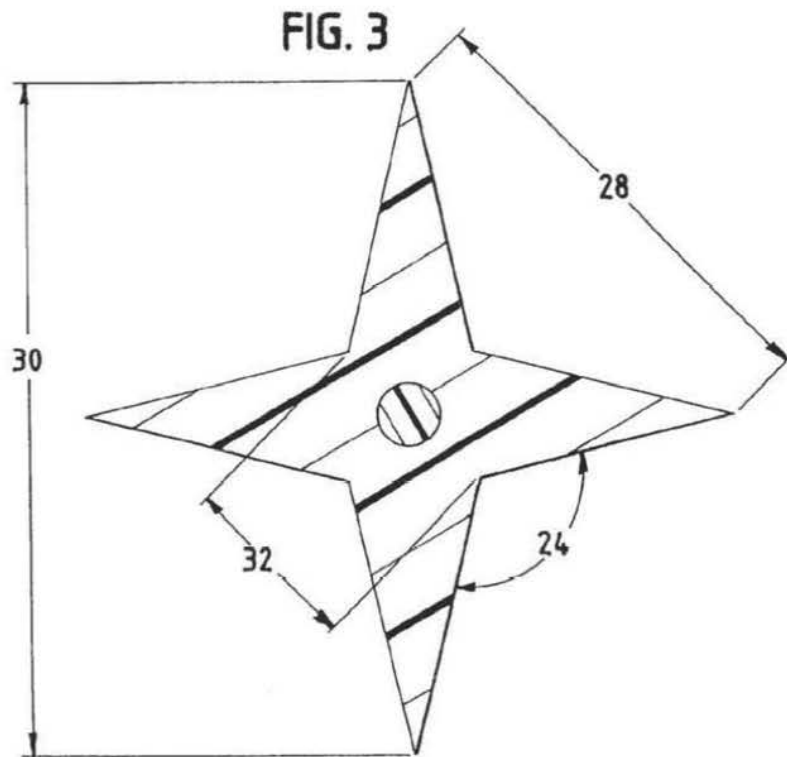
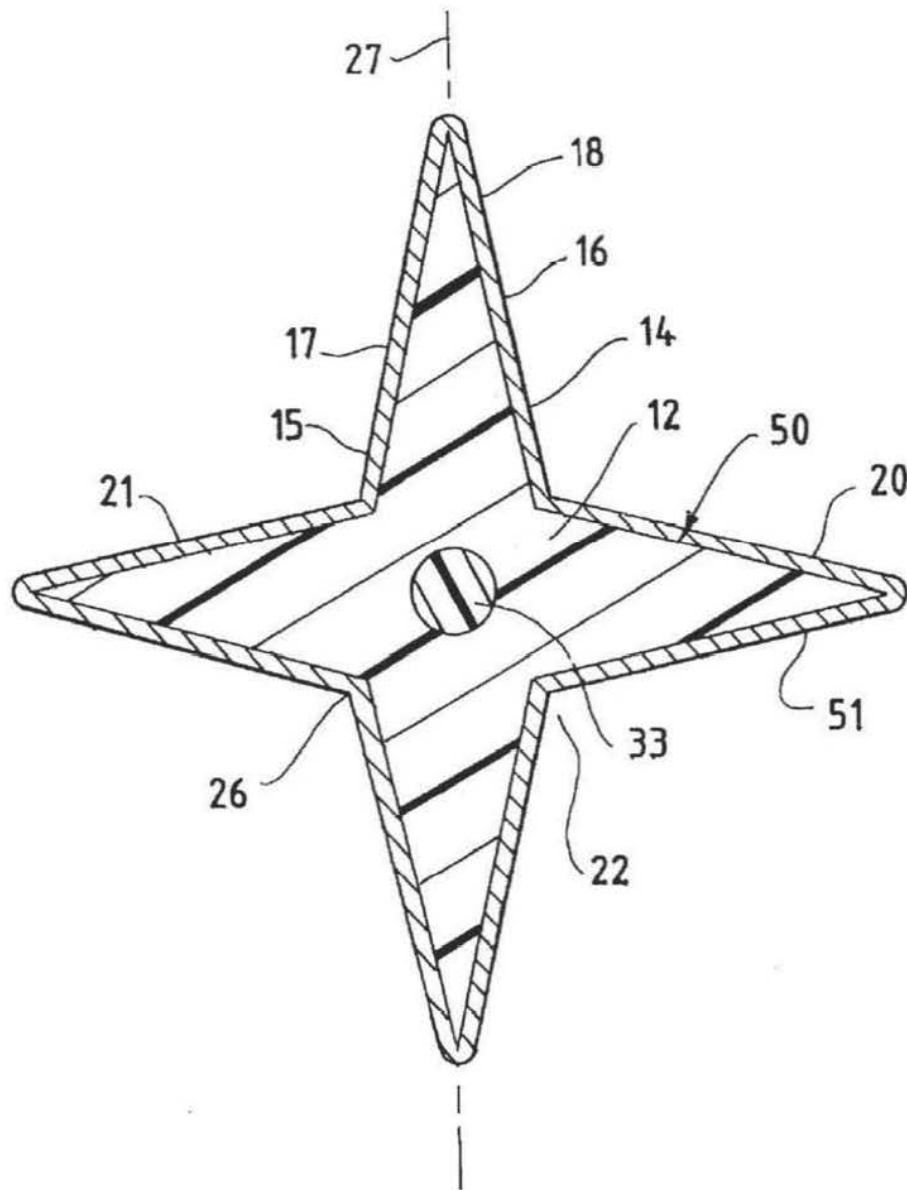


FIG. 5



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HIGH PERFORMANCE DATA CABLE

The present application is a continuation of application Ser. No. 09/765,914 filed Jan. 18, 2001 now U.S. Pat. No. 7,339,116 which is a continuation-in-part of application Ser. No. 08/629,509 filed Apr. 9, 1996 now U.S. Pat. No. 5,789,711 and Ser. No. 09/074,272 filed May 7, 1998 now U.S. Pat. No. 6,222,130.

FIELD OF INVENTION

This invention relates to a high performance data cable utilizing twisted pairs. The data cable has an interior support or star separator around which the twisted pairs are disposed.

BACKGROUND OF THE INVENTION

Many data communication systems utilize high performance data cables having at least four twisted pairs. Typically, two of the twisted pairs transmit data and two of the pairs receive data. A twisted pair is a pair of conductors twisted about each other. A transmitting twisted pair and a receiving twisted pair often form a subgroup in a cable having four twisted pairs.

A high performance data cable utilizing twisted pair technology must meet exacting specifications with regard to data speed and electrical characteristics. The electrical characteristics include such things as controlled impedance, controlled near-end cross-talk (NEXT), controlled ACR (attenuation minus cross-talk) and controlled shield transfer impedance.

One way twisted pair data cables have tried to meet the electrical characteristics, such as controlled NEXT, is by utilizing individually shielded twisted pairs (ISTP). These shields insulate each pair from NEXT. Data cables have also used very complex lay techniques to cancel E and B fields to control NEXT. Finally, previous data cables have tried to meet ACR requirements by utilizing very low dielectric constant insulations. The use of the above techniques to control electrical characteristics has problems.

Individual shielding is costly and complex to process. Individual shielding is highly susceptible to geometric instability during processing and use. In addition, the ground plane of individual shields, 360.degree. in ISTP's, lessens electrical stability.

Lay techniques are also complex, costly and susceptible to instability during processing and use.

Another problem with many data cables is their susceptibility to deformation during manufacture and use. Deformation of the cable's geometry, such as the shield, lessens electrical stability. Applicant's unique and novel high performance data cable meets the exacting specifications required of a high performance data cable while addressing the above problems.

This novel cable has an interior support with grooves. Each groove accommodates at least one signal transmission conductor. The signal transmission conductor can be a twisted pair conductor or a single conductor. The interior support provides needed structural stability during manufacture and use. The grooves also improve NEXT control by allowing for the easy spacing of the twisted pairs. The easy spacing lessens the need for complex and hard to control lay procedures and individual shielding.

The interior support allows for the use of a single overall foil shield having a much smaller ground plane than individual shields. The smaller ground plane improves electrical stability. For instance, the overall shield improves shield

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transfer impedance. The overall shield is also lighter, cheaper and easier to terminate than ISTP designs.

The interior support can have a first material and a different second material. The different second material forms the outer surface of the interior support and thus forms the surface defining the grooves. The second material is generally a foil shield and helps to control electricals between signal transmission conductors disposed in the grooves. The second material, foil shield, is used in addition to the previously mentioned overall shield.

This novel cable produces many other significant advantageous results such as:

improved impedance determination because of the ability to precisely place twisted pairs;

the ability to meet a positive ACR value from twisted pair to twisted pair with a cable that is no larger than an ISTP cable; and

an interior support which allows for a variety of twisted pair dimensions.

Previous cables have used supports designed for coaxial cables. The supports in these cables are designed to place the center conductor coaxially within the outer conductor. The supports of the coaxial designs are not directed towards accommodating signal transmission conductors. The slots in the coaxial support remain free of any conductor. The slots in the coaxial support are merely a side effect of the design's direction to center a conductor within an outer conductor with a minimal material cross section to reduce costs. In fact, one would really not even consider these coaxial cable supports in concurrence with twisted pair technology.

SUMMARY OF THE INVENTION

In one embodiment, we provide a data cable which has a one piece plastic interior support. The interior support extends along the longitudinal length of the data cable. The interior support has a central region which extends along the longitudinal length of the interior support. The interior support has a plurality of prongs. Each prong is integral with the central region. The prongs extend along the longitudinal length of the central region and extend outward from the central region. The prongs are arranged so that each prong of said plurality is adjacent with at least two other prongs.

Each pair of adjacent prongs define a groove extending along the longitudinal length of the interior support. The prongs have a first and second lateral side. A portion of the first lateral side and a portion of the second lateral side of at least one prong converge towards each other.

The cable further has a plurality of insulated conductors disposed in at least two of the grooves.

A cable covering surrounds the interior support. The cable covering is exterior to the conductors.

Applicant's inventive cable can be alternatively described as set forth below. The cable has an interior support extending along the longitudinal length of the data cable. The interior support has a central region extending along the longitudinal length of the interior support. The interior support has a plurality of prongs. Each prong is integral with the central region. The prongs extend along the longitudinal length of the central region and extend outward from the central region. The prongs are arranged so that each prong is adjacent with at least two other prongs.

Each prong has a base. Each base is integral with the central region. At least one of said prongs has a base which has a horizontal width greater than the horizontal width of a portion

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of said prong above said base. Each pair of the adjacent prongs defines a groove extending along the longitudinal length of the interior support.

A plurality of conductors is disposed in at least two of said grooves.

A cable covering surrounds the interior support. The cable covering is exterior to the conductors.

The invention can further be alternatively described by the following description. An interior support for use in a high-performance data cable. The data cable has a diameter of from about 0.300" to about 0.400". The data cable has a plurality of insulated conductor pairs.

The interior support in said high-performance data cable has a cylindrical longitudinally extending central portion. A plurality of splines radially extend from the central portion. The splines also extend along the length of the central portion. The splines have a triangular cross-section with the base of the triangle forming part of the central portion, each triangular spline has the same radius. Adjacent splines are separated from each other to provide a cable chamber for at least one pair of conductors. The splines extend longitudinally in a helical, S, or Z-shaped manner.

An alternative embodiment of applicant's cable can include an interior support having a first material and a different second material. The different second material forms an outer surface of the interior support. The second material conforms to the shape of the first material. The second material can be referred to as a conforming shield because it is a foil shield which conforms to the shape defined by the outer surface of the first material.

Accordingly, the present invention desires to provide a data cable that meets the exacting specifications of high performance data cables, has a superior resistance to deformation during manufacturing and use, allows for control of near-end cross talk, controls electrical instability due to shielding, and can be a 300 MHz cable with a positive ACR ratio.

It is still another desire of the invention to provide a cable that does not require individual shielding, and that allows for the precise spacing of conductors such as twisted pairs with relative ease.

It is still a further desire of the invention to provide a data cable that has an interior support that accommodates a variety of AWG's and impedances, improves crush resistance, controls NEXT, controls electrical instability due to shielding, increases breaking strength, and allows the conductors such as twisted pairs to be spaced in a manner to achieve positive ACR ratios.

Other desires, results, and novel features of the present invention will become more apparent from the following drawing and detailed description and the accompanying claims.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a vertical cross-sectional view taken along a plane of one embodiment of this invention.

FIG. 1a is a blow up of a portion of the cross section shown in FIG. 1.

FIG. 2 is a top right perspective view of this invention. The view shows the cable cut away to expose its various elements. The view further shows the helical twist of the prongs or splines.

FIG. 3 is a vertical cross-section of the interior support or star separator showing some of the dimensions of the interior support or star separator.

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FIG. 4 is a vertical cross-section of the interior or star separator support showing the features of the prongs or splines.

FIG. 5 is a vertical cross-section of an alternative embodiment of an interior support or star separator showing the conforming foil shield which makes up the second material of the interior support.

DETAILED DESCRIPTION

The following description will further help to explain the inventive features of this cable.

FIG. 1 is a vertical cross-section of one embodiment of this novel cable. The shown embodiment has an interior support or star separator (10). The interior support or star separator runs along the longitudinal length of the cable as can be seen in FIG. 2. The interior support or star separator, hereinafter, in the detailed description, both referred to as the "star separator", has a central region (12) extending along the longitudinal length of the star separator. The star separator has four prongs or splines. Each prong or spline (14), hereinafter in the detailed description both referred to as splines, extends outward from the central region and extends along the longitudinal length of the central region. The splines are integral with the central region. Each spline has a base portion (15). Each base portion is integral with the central region. Each spline has a base portion which has a horizontal width greater than the horizontal width of a portion of said spline above said base.

Each spline also has a first lateral side (16) and a second lateral side (17). The first and second lateral sides of each spline extend outward from the central region and converge towards each other to form a top portion (18). Each spline has a triangular cross section with preferably an isosceles triangle cross section. Each spline is adjacent with at least two other splines. For instance, spline (14) is adjacent to both adjacent spline (20) and adjacent spline (21).

The first lateral side of each spline is adjacent with a first or a second lateral side of another adjacent spline. The second lateral side of each spline is adjacent to the first or second side of still another adjacent spline.

Each pair of adjacent splines defines a groove (22). The angle (24) of each groove is greater than 90°. The adjacent sides are angled towards each other so that they join to form a crevice (26). The groove extends along the longitudinal length of the star separator. The splines are arranged around the central region so that a substantial congruency exists along a straight line (27) drawn through the center of the horizontal cross section of the star separator. Further, the splines are spaced so that each pair of adjacent splines has a distance (28), measured from the center of the top of one spline to the center of the top of an adjacent spline (top to top distance) as shown in FIG. 3. The top to top distance (28) being substantially the same for each pair of adjacent splines.

In addition, the shown embodiment has a preferred "tip to crevice" ratio of between about 2.1 and 2.7. Referring to FIG. 3. The "tip distance" (30) is the distance between two top portions opposite each other. The "crevice distance" (32) is the distance between two crevices opposite each other. The ratio is measured by dividing the "tip" distance by the "crevice" distance.

The specific "tip distance", "crevice distance" and "top to top" distances can be varied to fit the requirements of the user such as various AWG's and impedances. The specific material for the star separator also depends on the needs of the user such as crush resistance, breaking strengths, the need to use gel fillings, the need for safety, and the need for flame and

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smoke resistance. One may select a suitable copolymer. The star separator is solid beneath its surface.

A strength member may be added to the cable. The strength member (33) in the shown embodiment is located in the central region of the star separator. The strength member runs the longitudinal length of the star separator. The strength member is a solid polyethylene or other suitable plastic, textile (nylon, aramid, etc.), fiberglass (FGE rod), or metallic material.

Conductors, such as the shown insulated twisted pairs, (34) are disposed in each groove. The pairs run the longitudinal length of the star separator. The twisted pairs are insulated with a suitable copolymer. The conductors are those normally used for data transmission. The twisted pairs may be Belden's DATATWIST 350 twisted pairs. Although the embodiment utilizes twisted pairs, one could utilize various types of insulated conductors with the star separator.

The star separator may be cabled with a helixed or S-Z configuration. In a helical shape, the splines extend helically along the length of the star separator as shown in FIG. 2. The helically twisted splines in turn define helically twisted conductor receiving grooves which accommodate the twisted pairs.

The cable (37) as shown in FIG. 2 is a high performance shielded 300 Mhz data cable. The cable has an outer jacket (36), e.g., polyvinyl chloride.

Over the star separator is a polymer binder sheet (38). The binder is wrapped around the star separator to enclose the twisted pairs. The binder has an adhesive on the outer surface to hold a laterally wrapped shield (40). The shield (40) is a tape with a foil or metal surface facing towards the interior of the jacket. The shield in the shown embodiment is of foil and has an overbelt (shield is forced into round smooth shape) (41) which may be utilized for extremely well controlled electricals. A metal drain wire (42) is spirally wrapped around the shield. The drain spiral runs the length of the cable. The drain functions as a ground.

My use of the term "cable covering" refers to a means to insulate and protect my cable. The cable covering being exterior to said star member and insulated conductors disposed in said grooves. The outer jacket, shield, drain spiral and binder described in the shown embodiment provide an example of an acceptable cable covering. The cable covering, however, may simply include an outer jacket.

The cable may also include a gel filler to fill the void space (46) between the interior support, twisted pairs and a part of the cable covering.

An alternative embodiment of the cable utilizes an interior support having a first inner material (50) and a different second outer material (51) (see FIG. 5). The second material is a conforming shield which conforms to the shape defined by the outer surface of the first material (50). The conforming shield is a foil shield. The foil shield should have enough thickness to shield the conductors from each other. The shield should also have sufficient thickness to avoid rupture during conventional manufacture of the cable or during normal use of the cable. The thickness of the conforming shield utilized was about 3 mm. The thickness could go down to even 0.3 mm. Further, although the disclosed embodiment utilizes a foil shield as the conforming shield, the conforming shield could alternatively be a conductive coating applied to the outer surface of the first material (50).

To conform the foil shield (51) to the shape defined by the first material's (50) outer surface, the foil shield (51) and an already-shaped first material (50) are placed in a forming die. The forming die then conforms the shield to the shape defined by the first material's outer surface.

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The conforming shield can be bonded to the first material. An acceptable method utilizes heat pressure bonding. One heat pressure bonding technique requires utilizing a foil shield with an adhesive vinyl back. The foil shield, after being conformed to the shape defined by the first material's outer surface, is exposed to heat and pressure. The exposure binds the conforming shield (51) to the outer surface of the first material (50).

A cable having an interior support as shown in FIG. 5 is the same as the embodiment disclosed in FIG. 1 except the alternative embodiment in FIG. 5 includes the second material, the conforming shield (51), between the conductors and the first material (50).

The splines of applicants' novel cable allow for precise support and placement of the twisted pairs. The star separator will accommodate twisted pairs of varying AWG's and impedance. The unique triangular shape of the splines provides a geometry which does not easily crush.

The crush resistance of applicants' star separator helps preserve the spacing of the twisted pairs, and control twisted pair geometry relative to other cable components. Further, adding a helical or S-Z twist improves flexibility while preserving geometry.

The use of an overall shield around the star separator allows a minimum ground plane surface over the twisted pairs, about 45° of covering. The improved ground plane provided by applicant's shield, allows applicant's cable to meet a very low transfer impedance specification. The overall shield may have a more focused design for ingress and egress of cable emissions and not have to focus on NEXT duties.

The strength member located in the central region of the star separator allows for the placement of stress loads away from the pairs.

It will, of course, be appreciated that the embodiment which has just been described has been given by way of illustration, and the invention is not limited to the precise embodiments described herein; various changes and modifications may be effected by one skilled in the art without departing from the scope or spirit of the invention as defined in the appended claims.

The invention claimed is:

1. A communications cable comprising:

a plurality of twisted pairs that carry communications signals;

a pair separator disposed among the plurality of twisted pairs, the pair separator comprising a central body portion and a plurality of arms radially extending from the central body portion, each pair of adjacent arms defining a channel; and

a cable covering surrounding the plurality of twisted pairs and the pair separator along the length of the cable; wherein at least one twisted pair of the plurality of twisted pairs is respectively located in the channel defined by each pair of adjacent arms;

wherein the plurality of twisted pairs and the pair separator are helically twisted together along the length of the cable; and

wherein the cable covering does not include an electrically conductive shield.

2. The communications cable as claimed in claim 1, wherein the plurality of twisted pairs consists of four twisted pairs.

3. The communications cable as claimed in claim 2, wherein the plurality of arms consists of four arms.

4. The communications cable as claimed in claim 1, wherein a single twisted pair is respectively located in the channel defined by each pair of adjacent arms.

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5. The communications cable as claimed in claim 1, wherein the pair separator consists of a dielectric material.

6. The communications cable as claimed in claim 1, wherein the communications cable is about 0.300 to 0.400 is diameter.

7. A communications cable comprising:

a plurality of twisted pairs that carry communications signals;

a pair separator disposed among the plurality of twisted pairs, the pair separator comprising a central body portion and a plurality of arms radially extending from the central body portion, each pair of adjacent arms defining a channel; and

a jacket surrounding the plurality of twisted pairs and the pair separator along the length of the cable;

wherein at least one twisted pair of the plurality of twisted pairs is respectively located in the channel defined by each pair of adjacent arms;

wherein the jacket and the pair separator together maintain the plurality of twisted pairs in the respective channels; and

wherein the communications cable does not include an electrically conductive shield.

8. The communications cable as claimed in claim 7, wherein the plurality of twisted pairs consists of four twisted pairs.

9. The communications cable as claimed in claim 8, wherein the plurality of arms consists of four arms.

10. The communications cable as claimed in claim 7, wherein a single twisted pair is respectively located in the channel defined by each pair of adjacent arms.

11. The communications cable as claimed in claim 7, wherein pair separator consists of a dielectric material.

12. A data communications cable comprising:

a plurality of twisted pairs that carry data communications signals;

a dielectric interior support having a central body portion and a plurality of arms extending from the central body portion, each pair of adjacent arms of the plurality of arms defining a channel; and

a cable covering that surrounds the plurality of twisted pairs and the dielectric interior support along the length of the data communications cable;

wherein the dielectric interior support is configured in combination with the cable covering to maintain the plurality of twisted pairs within the channels defined by the plurality of arms of the dielectric interior support; and

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wherein the plurality of twisted pairs and the dielectric interior support are helically twisted together along the length of the data communications cable.

13. The data communications cable as claimed in claim 12, wherein the plurality of twisted pairs consists of four twisted pairs.

14. The data communications cable as claimed in claim 13, wherein the plurality of arms consists of four arms defining four channels.

15. The data communications cable as claimed in claim 14, wherein one twisted pair of the plurality of twisted pairs is respectively disposed in each one channel.

16. The data communications cable as claimed in claim 12, wherein the cable covering does not include an electrically conductive shield.

17. The data communications cable as claimed in claim 12, wherein each arm of the plurality of arms is adjacent to two other arms.

18. The data communications cable as claimed in claim 12, wherein the cable covering does not include an electrically conductive shield.

19. A data communications cable comprising:

a plurality of twisted pairs;

an interior support comprising a longitudinally extending central portion and a plurality of arms radially extending from the central portion along the length of the central portion, each arm of the plurality of arms being adjacent to two other arms of the plurality of arms, the plurality of arms forming a plurality of pairs of adjacent arms, the plurality of pairs of adjacent arms defining a corresponding plurality of grooves; and

a jacket covering the plurality of twisted pairs and the interior support along the length of the data communications cable;

wherein one twisted pair of the plurality of twisted pairs is respectively located in each groove of the plurality of grooves; and

wherein the plurality of twisted pairs and the interior support are helically twisted together along the length of the data communications cable; and

wherein the data communications cable does not include an electrically conductive shield surrounding the plurality of twisted pairs.

20. The data communications cable as claimed in claim 19, wherein the interior support consists of a dielectric material.

21. The communications cable as claimed in claim 7, wherein the pair separator and the plurality of twisted pairs are cabled in an S-Z configuration.

* * * * *

**United States Court of Appeals
for the Federal Circuit**
Belden Inc. v. Berk-Tek LLC, 14-1677

CERTIFICATE OF SERVICE

I, John C. Kruesi, Jr., being duly sworn according to law and being over the age of 18, upon my oath depose and say that:

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On **October 3, 2014**, counsel has authorized me to electronically file the foregoing **Brief for Appellant** with the Clerk of Court using the CM/ECF System, which will serve via e-mail notice of such filing to all counsel registered as CM/ECF users, including any of the following:

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October 3, 2014

/s/ John C. Kruesi, Jr.
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CERTIFICATE OF COMPLIANCE

Appellant Belden's brief is submitted in accordance with Federal Rule of Appellate Procedure 32(a)(7)(B)(i). As to the items identified in Federal Rule of Appellate Procedure 32(a)(b)(B)(iii), the brief contains 11,097 words, as determined by Microsoft Word.

This brief has been prepared in proportionally spaced typeface using Microsoft Word in 14 point Times New Roman font.

Dated: October 3, 2014

Respectfully submitted,

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